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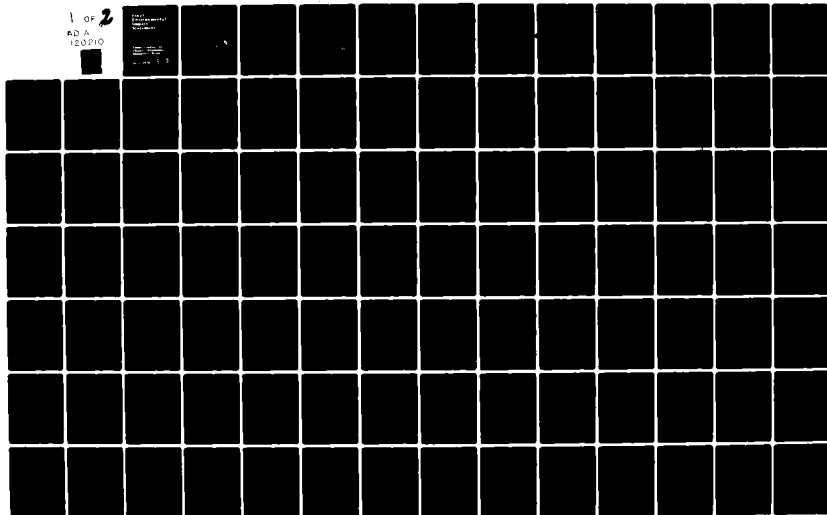
CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT
MINNESOTA RIVER AT CHASKA, MINNESOTA, FLOOD CONTROL. FINAL ENVI--ETC(U)
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Final Environmental Impact Statement

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Flood Control At
Chaska, Minnesota
Minnesota River

July 1975

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Flood control Environmental impact statements Chaska, Minnesota		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
<p>The plan consists of upgrading and extending an existing levee along the Minnesota River, diverting total flows of Chaska Creek to the outside of the leveed area, diverting flood flows of East Creek to the outside of the leveed area, and constructing interior drainage facilities. This would require the removal of 6 mobile homes and 7 houses and commits the following lands to aesthetically disruptive flood control structures: 20 acres of cleared upland; 2 1/2 acres of wooded upland; about 5 acres of wet meadow grading to marsh; and 10 acres of floodplain wetland interspersed with bottomland trees.</p>		

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Drainage of about 30 acres of wetland would be completed by the East Creek bypass channel, and an additional 200 acres could be affected to an undetermined but probably limited extent.

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL
MINNESOTA RIVER AT
CHASKA, MINNESOTA

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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Office, Chief of Engineers
July 1975

SUMMARY

FLOOD CONTROL AT

CHASKA, MINNESOTA, MINNESOTA RIVER

() Draft

(X) Final Environmental Statement

Responsible Office: U.S. Army Engineer District, St. Paul, Minnesota

1. Name of Action: () Administration (X) Legislative

2. Description of Action: The plan consists of upgrading and extending an existing levee along the Minnesota River, diverting total flows of Chaska Creek to the outside of the leveed area, diverting flood flows of East Creek to the outside of the leveed area, and constructing interior drainage facilities.

3. a. Favorable Environmental Impacts: The plan provides protection against the intermediate regional floods of Chaska Creek, East Creek, and the Minnesota River for about 500 homes and 47 businesses in low-lying areas of Chaska, Minnesota. / Local, regional, and national economic gain would result from protection of developed and undeveloped lands. During flood seasons there could be reduced anxiety and hardships. Public health and safety could be protected during all but the most severe floods.

b. Adverse Environmental Impacts: The proposed plan requires the removal of 6 mobile homes and 7 houses and commits the following lands to aesthetically disruptive flood control structures: 20 acres of cleared upland; 2 1/2 acres of wooded upland; about 5 acres of wet meadow grading to marsh; and 10 acres of floodplain wetland interspersed with bottomland trees. Drainage of about 30 acres of wetland would be completed by the East Creek bypass channel, and an additional 200 acres could be affected to an undetermined but probably limited extent. This would adversely affect organisms presently in balance with wetland environmental factors. Protection from flooding for riparian vegetation would cause decreased biological productivity and result in a species composition more characteristic of the drier uplands. The potential damage by a greater than intermediate regional flood would increase due to development and redevelopment in the project area.

4. Alternatives:

- a. Flood forecasting and warning.
- b. Floodplain evacuation.
- c. Flood proofing.
- d. Flood insurance.
- e. Floodplain regulation.

- f. Diversion of Chaska Creek and flood bypass on East Creek.
- g. Upgrading and extending of existing emergency levee.
- h. Combination of f and g above.
- i. Construction of four headwaters reservoirs.
- j. Construction of four headwaters reservoirs combined with a channel diversion for Chaska Creek, a flood bypass channel for East Creek, and extension and upgrading of the existing levee.
- k. Two large dams at the bluffs of the Minnesota River valley, one on Chaska Creek and one on East Creek.

- l. Combination of plan k and plan g.
- m. Channelization of 2 1/2 miles of Chaska and East Creeks.
- n. Combination of plan m and plan g.
- o. No action.

5. a. Comments Received (District Review):

U.S. Environmental Protection Agency
 U.S. Department of the Interior
 U.S. Department of Agriculture
 Soil Conservation Service
 Forest Service
 U.S. Department of Transportation
 Federal Highway Administration
 U.S. Coast Guard
 Minnesota Department of Natural Resources
 Minnesota Department of Highways
 Minnesota Pollution Control Agency
 Minnesota State Planning Agency
 Minnesota State Historical Society (Office of State
 Archaeologist)
 Mayor, City of Chaska
 Sierra Club, North Star Chapter
 Minneapolis Bird Club

b. Comments Received (Departmental Review):

U.S. Department of Interior
 U.S. Department of Agriculture
 U.S. Department of Transportation
 U.S. Environmental Protection Agency
 Minnesota Department of Natural Resources

6. Draft Statement to CEQ: 13 November 1973

Revised Draft Statement to CEQ: 8 November 1974

Final Statement to CEQ: _____

FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL AT CHADAK, MINNESOTA, MINNESOTA RIVER

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1	Chaska and East Creek Watershed
2	Floodplain Areas at Chaska, Minnesota
3	Proposed Improvements

FINAL
ENVIRONMENTAL IMPACT STATEMENT
FLOOD CONTROL AT
CHASKA, MINNESOTA, MINNESOTA RIVER

1. DESCRIPTION OF THE PROPOSED ACTION

The city of Chaska is located in south-central Minnesota at the confluence of Chaska and East Creeks with the Minnesota River (plate 1). The lower parts of the city are subject to flooding from the Minnesota River, and the two creeks could also flood parts of the city and pond behind the existing levee which protects Chaska from floods on the Minnesota River. The area which would be inundated by floods on the two creeks and the river is shown on plate 2. The depicted inundation would occur during a flood of a size to be expected only once in every 100 years. Part of the area shown as flooded on plate 2 could be flooded by high flows on either the river or the creeks.

The proposed plan of flood control for Chaska consists of diverting Chaska Creek and bypassing flood flows of East Creek around the heavily developed areas of the city, combined with the upgrading and extension of the existing emergency levee and adequate interior drainage facilities (plate 3). The diversions would require earthen embankments to divert flood flows into rock-lined channels which would carry flows to the Minnesota River floodplain.

The proposed route for East Creek would call for a flood diversion structure in the Brandondale area of Chaska which would divert flood waters into a bypass channel which would lead first to the east and then southward just west of the Gedney Pickle Factory. Water would then be channeled down a terrace bank, across abandoned agricultural lands growing up to forest in the river bottom, and to the edge of the Minnesota River. This would require crossing County Highway 17, U.S. Highway 212, two sets of railroad tracks, and a city street. This bypass channel would lie to the west of a proposed relocation of State Highway 41 and would require the relocation of six mobile homes in Brandondale and three houses at the edge of the terrace bank. The length of the channel would be approximately 1.2 miles. The channel top width would range from 100 to 150 feet, and the depth would be approximately 11 feet. Side slopes along most of the channel would be 1 on 2.5, and channel capacity would be 4,350 cfs (cubic feet per second).

This route for East Creek was selected from among five alternate paths. Two of the alternate routes would have required channelization of the existing stream bed, and the other two would have resulted in greater drainage of a 230-acre wetland area as compared with the proposed plan. The latter two routes would have gone through the city of Chanhassen.

The proposed diversion channel for Chaska Creek would start north of U.S. Highway 212 and, after passing under the existing highway bridge, would route the creek between 2 sets of railroad tracks and terminate in the existing creek channel south of First Street. This would require crossing under the railroad tracks and First Street. The length of the diversion channel would be about 0.9 mile. The top width of the channel would range from 100 to 150 feet, and the depth would be about 12 feet. Side slopes would be 1 on 2.5, and channel capacity would be 4,700 cfs.

Upgrading of the existing levee and interior drainage facilities is also included in the proposed plan. The side slopes would be flattened to 1 on 2.5, and approximately 5,700 feet of the existing levee would be raised about 1 foot to provide intermediate regional flood protection with 4 feet of freeboard. About 500 feet of new levee would be constructed on the upstream portion of the existing levee. Similarly, about 3,000 feet of new levee would be constructed on the east end of the city in order to inclose the Courthouse Lake area and to tie the existing levee into high ground. (The tie-back to high ground presently has a top elevation about equal to a 3 percent flood and is discontinuous.) This work would require the removal of four homes. Extension of the levee would result in the partial removal of an abandoned dump and landfill from the floodplain.

A ponding area in the proposed city park north of Courthouse Lake would be included to store interior drainage flows. The greatest demand for storage would occur in the event that substantial local rainfall occurred while the Minnesota River was in flood stage. The ponding area would include a 60 acre-foot primary pond plus an additional 60 acre-feet of ponding in Courthouse Lake. A gated control structure would be installed between the primary pond and lake to reduce the frequency of use of the lake as a ponding area. A pumping plant would be to the northeast of the lake. Interior drainage facilities would be improved by adding larger, gated gravity storm water pipes to the Minnesota River, three other pumping plants, about 6,000 feet of storm water interceptor conduit, and a relief well system to reduce uplift problems and control seepage flows.

Measures to enhance the aesthetic and recreational qualities of the levee would include an asphalt foot and bicycle trail along most of the levee (The trail would roughly follow the strip identified as "proposed levee" on plate 3.), as well as a trail encircling Courthouse Lake. Local interests have also indicated an interest in developing trails along the Chaska Creek diversion channel and along East Creek to allow connection with other contemplated trail systems in the area.

Aesthetic treatment would include placing surplus excavated materials in overburden areas along both sides of the levee. On the landward side of the levee, these warps could be constructed so as to decrease the impact of straight lines on the landscape. The levee and warps would be seeded with a mixture of short prairie grasses, and the warps would be landscaped with trees and shrubs. Natural vegetation would also be allowed to grow on the warps. The vegetation should provide some wildlife habitat.

Plans for tree and shrub plantings along the Chaska Creek diversion channel and the East Creek bypass channel are included in the proposed plan. A trail system along the channels has been proposed but cannot be identified as part of the project at this time.

Methods to control erosion during construction could include silt retention devices at the sites of the diversion structures and outfalls to the Minnesota River. Construction of the levee and most of the channels would be done under dry conditions (depending upon the weather), and a program of having a limited disturbed area with interior ponding and immediate revegetation could be implemented. The proposed plan includes 3 drop structures on Chaska Creek and 3 on East Creek. These structures would reduce water velocities enough to allow use of riprap on the channel bottoms and side slopes for the two creeks except that 0.1 mile of Chaska Creek would be concrete-lined because of nearby constraining structures (U.S. Highway 212 bridge, a city street, and 2 houses). Riprap would be used at outfalls and the outward levee slope where erosion would otherwise occur. The landward slope, much of the outward slope, and the top of the levee as well as the slopes of ditches and ramps would be covered with 4 inches of topsoil and seeded to a mixture of several short prairie grasses. Disposal areas for excess or unsuitable excavated materials would also be seeded.

At 1973 price levels the proposed plan would have a total first cost (Federal and local) of \$9,543,000. Interest during construction would be an estimated \$389,000 for a total economic investment of \$9,932,000. Total annual charges would be \$579,000 and would include \$561,000 for interest and amortization (for a 100-year life at 5 5/8 percent interest); \$17,000 for operation, maintenance and major replacements; and \$1,000 for maintenance of recreational trails.

Estimated average annual benefits would total \$771,000, being composed of \$767,000 for urban flood damage reduction and related benefits and \$4,000 for increased recreation. Economic data for flood damages take into account growth to existing development in the floodplain between the base year (1973) and the assumed date of initial project operation (1980).

Flood damage and related benefits consist of actual flood damage to existing and future developments in the floodplain, and flood control related benefits. These related benefits include flood proofing cost savings to new development and to redevelopment, and increased land utilization, all of which are directly attributable to the proposed project.

Using these data and assumptions, the total average annual costs of \$579,000 and the average annual benefits of \$771,000 would yield a benefit-cost ratio of 1.3.

2. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

INTRODUCTION

The city of Chaska is located in Carver County, Minnesota, on the left (north) bank of the Minnesota River about 20 miles southwest of Minneapolis, Minn. The population of Chaska was estimated at 4,352 persons during the 1970 census, showing an increase of about 74 percent over the preceding decade. Most of the increase has been due to large annexations by the city; the Hazeltine area was annexed in 1963 and the Jonathan area in 1967. Most city residents are engaged in food processing and service industries or commute to the Minneapolis-St. Paul area for employment. The city limits include the original village of Chaska, which is located predominately in the floodplains of the Minnesota River and Chaska and East Creeks, as well as the Jonathan unit which is the largest planned community in Minnesota. Jonathan is located above the bluffs of the Minnesota River on the glacial till plain. Between 20 and 30 percent of the Jonathan area has been planned for preservation as open space, including greenbelt areas (preserved natural vegetation) and lakes. Tree cover and ground vegetation will be especially protected on slopes, and housing sites and roads will be located to preserve natural characteristics of the watershed. This seems to be a general trend as many local suburbs are requiring developers to set aside land for parks and open space at the rate of 1 acre per 75 people, more than twice the rate in nearby urban areas.

Extensive flood damages were sustained by residential, business, and municipal properties as the result of high stages on the Minnesota River at Chaska in 1952, 1965, and 1969. There is some evidence of a flood occurring on Chaska and East Creeks in July 1951. A greater flood threat than under natural conditions now exists from these creeks because flood flows would impound behind the 20 to 25-foot high, 6,000 foot long emergency levee which was constructed by local interests after the 1952 flood on the Minnesota River.

CLIMATE

The climate of Chaska and its vicinity is moderate, characterized by wide variations in temperature, normally sufficient rainfall for crops, and moderate snowfall. The Chaska weather observation station was established in May of 1925 and has been in operation since that time.

The mean annual temperature for Chaska is about 45°F., with the mean monthly temperature varying from about 74°F. in July to 14°F. in January. The most extreme temperatures recorded were a high of 109°F. on 14 July 1936 and a low of -43°F. on 30 January 1951. The average number of days between freezing temperatures is 153.

The average annual precipitation in Chaska is 27.12 inches. Annual precipitation has ranged from a maximum of 39.94 inches in 1965 to a minimum of 16.44 inches in 1936. The normal monthly precipitation varies from a maximum of 4.89 inches in June to a minimum of 0.54 inch in January. Snowfall records for Minneapolis, which is located approximately 19 miles northeast of Chaska, indicate an average annual snowfall of about 44 inches. The snowfall represents approximately 16 percent of the yearly precipitation.

Only one major storm has been recorded for the region of Chaska, and it centered in Minneapolis. The storm duration was from 24-28 July 1892, during which time 8.4 inches of rainfall fell in 60 hours at Minneapolis. Of this amount, 6.35 inches fell within 12 hours.

The maximum rainfall recorded at Chaska for a 24-hour period is 4.96 inches, occurring on 8 July 1955.

Wind records for the Minneapolis-St. Paul International Airport (located 19 miles northeast of Chaska) indicate the prevailing wind to be from the northwest. A monthly breakdown of the prevailing wind indicates it to be from the northwest for the months of November, December, January, February, March, and April; from the southeast for the months of May, June, August and October; and from the south for the months of July and September. The mean annual wind speed is 10.7 miles per hour, and the fastest speed observed was 92 miles per hour from the west in July 1951.

TOPOGRAPHY

Most of the developed portion of the original city of Chaska is located within the Minnesota River valley, and part is within the floodplain. The valley trends northeast and is 2.5 miles wide in this reach. The floodplain lies at approximately elevation 705, averages 1 mile in width, and is characterized by extensive marshy areas and lakes. Alluvial and bedrock terraces rise above the floodplain and form regionally prominent benches at elevations 750 and 800. The city of Chaska is situated between elevation 710 and 730 at the upstream limit of a terrace that trends northeast along the base of the valley wall. The intermediate regional floodplain of the Minnesota River in this area is designated as elevation 723. The river valley walls rise sharply above the floodplain and terraces.

GEOLOGY

The project area was glaciated extensively during the Pleistocene Epoch and was last covered by the Des Moines lobe of the late Wisconsin (Mankato) glaciation which laid down thick deposits of unsorted calcareous tills. The till deposits today form a hummocky, poorly-drained plain dotted with marshes and small lakes. The glacial drift reaches a thickness of 200 to 250 feet and rests on dolomite and sandstone of the Prairie du Chien and Jordan Formations. The large valley of the present Minnesota River was carved by the glacial River Warren, which carried large volumes of water discharging from the now-extinct glacial Lake Agassiz located in western Minnesota, eastern North Dakota, and adjacent Canada. This river, the ancestor to the Minnesota River, cut deeply into the bedrock and formed the terraces that are prominent today. As the flows decreased, the valley was filled to its present level with alluvial sand, silt, and soft clay. The broad floodplain and lower terrace levels are frequently flooded, poorly drained, and characterized by a high water table.

MINERAL RESOURCES

The principal mineral resources of the Chaska area are the clay deposits which are used for making bricks. These deposits, found at the base of the Minnesota River valley escarpment and as thick clay lenses within the floodplain at Chaska, are nearly exhausted. Sand, gravel and crushed stone are available from several pits within the watersheds and along the valley walls of the Minnesota River.

SOILS

The general soil map for Carver County⁽¹⁾ shows four soil associations within the watersheds of Chaska and East Creeks. Soils in the Minnesota River bottomlands in the area of Chaska belong to the alluvial land-Chaska-Oshawa association. These are characteristically poorly-drained, medium-textured to moderately fine-textured soils. The association appears to be corrugated with short, narrow ridges and wet, marshy basins. Although most of these soils are subject to flooding, some fields on this association are high enough for cropland, but extensive areas are suitable only for pasture.

Also of minor extent in the Chaska and East Creek watersheds is the Salida-Hayden association, which is composed of very steep, coarse-textured to medium-textured soils on hills and bluffs along the Minnesota River and tributary streams. Many ravines and deep, broad gullies are present, and the association as a whole is too steep and severely eroded to be used as cropland. Much of the association is wooded, which appears to be the best use because permanent vegetation is needed for erosion control.

(1) U.S. Department of Agriculture, Soil Conservation Service, and University of Minnesota Agricultural Experimentation Station. 1968. Soil Survey, Carver County, Minn., U.S. Government Printing Office.

Two soil associations occur on the watersheds above the valley bluffs. One, the Hayden-Lester-Peat, covers more than half of the watersheds and is characterized by irregular strong slopes and hills, depressions, and many lakes, marshes, and bogs. The soils are deep, medium-textured to moderately fine-textured, and were formed under hardwood forests in loamy glacial till high in lime carbonates. While the uplands are deep, well-drained loams with a subsoil of brownish clay loam, the depressions are typically occupied by peat. Although the association is intensively farmed, many small areas are too steep to be used for crops and should be kept in permanent vegetation. The soils are subject to moderate to severe erosion. The frequent depressions, particularly if in conjunction with permanent vegetation, function significantly in retarding runoff and evening out the flow.

The other soil association occurring above the bluffs, the Lester-Hayden-Peat, is similarly a major feature occupying a little less than half the watersheds. This association is characterized by fairly long and smooth to short and irregular slopes, and by many lakes, marshes, and low wet bogs. The soils are deep, medium-textured to moderately fine-textured, and were formed in loamy glacial till under hardwoods and prairie grasses. Peat typically occupies the depressions. This association, like the previous, is intensively farmed with many dairy farms and also some corn, oats, and alfalfa cropland. Most of the acreage is cleared, but there are scattered wooded pastures and small woodlots. The Soil Survey notes that both of the soil associations occurring above the bluffs require drainage for optimum use as cropland.

The frequent lakes, marshes, and bogs on the watersheds have functioned in the past to retard runoff and even out the flow of Chaska and East Creeks. This function may be partially lost with urbanization, but the policies of open space preservation described in the opening paragraphs of this section will preserve this desirable function.

GROUNDWATER

Groundwater development in the project area is primarily from sandstone aquifers. The city of Chaska presently uses three wells with the following diameters and depths: a 10-inch well 525 feet deep, a 10-inch well 300 feet deep, and a 21-inch well 125 feet deep. An additional well is presently being drilled and will be 725 feet deep. The existing wells are pumped at a rate of 500 gallons per minute, and the new well should be capable of being pumped at a rate of 1,000 gallons per minute. Treatment of the

water consists of fluoridation and the removal of iron and manganese by gravity-sand filtration. Wells can be developed in the Minnesota valley in terrace gravels and the lower portions of the valley alluvium, but no extensive development of these sources is known in the area. According to the Report on Water Supply and Distribution System for Chaska, Minnesota, prepared in 1971 by Bonestroo, Rosene, Anderlik and Associates, Incorporated, all foreseeable future demands for water supply in the Chaska area can be met through utilization of groundwater supplies.

Aquifers underly portions of the Minnesota River Valley including the area of the East Creek bypass channel and the area near the Carver County Courthouse where the levee would be realigned. Present knowledge indicates that Minnesota River floodplain aquifers along the proposed levee extension to the northeast of the Milwaukee Railroad bridge are overlain by in excess of 40 feet of impervious material. Excavation during levee extension would be limited to about 25 feet in depth.

SURFACE WATERS

From Big Stone Lake in the headwaters, the Minnesota River descends about 277 feet for an average slope of 0.84 foot per mile. There is very little drop in the river downstream from Chaska. East Creek descends about 300 feet in 8 miles for an average slope of 37.5 feet per mile. Similarly, Chaska Creek drops about 300 feet in 10 miles for an average slope of 30.0 feet per mile.

At normal water level, the Minnesota River channel averages about 250 feet in width in the Chaska area, with a bank-full capacity of approximately 7,000 cfs. East Creek varies in width from 30 to 40 feet and, near U.S. Highway 212, has a bank-full capacity of about 500 cfs. Chaska Creek varies in width from 20 to 40 feet and has a bank-full capacity of about 1,000 cfs.

Low flows on the Minnesota River and East and Chaska Creeks occur during the late summer and fall months when evapotranspiration rates are high and also during the winter season when the river and creeks are ice-covered. During times of drought, East and Chaska Creeks could be expected to have little or no flow. The average flow of the Minnesota River at Carver, Minnesota, which is just upstream from Chaska, is 3,306 cfs or about 0.20 cfs per square mile of drainage area. This average flow is about 42 times greater than the recorded low flow of 79 cfs in 1955. The 100-year peak discharges on Chaska and East Creeks have been calculated as 4,700 and 4,350 cfs, respectively. The relatively low magnitude of these peaks reflects the runoff-retarding nature of the watershed.

Increases in peak runoff rates, which are expected in the future with expanding urbanization, have been considered in estimating the 100-year peak discharges. Although impending urbanization of the East Creek watershed would substantially increase runoff, the Jonathan program of small reservoir impoundments would approximately cancel increases in discharges on East Creek.

Peak flows of the Minnesota River at Chaska usually occur in the spring as a result of spring snowmelt and occasionally in the summer following intense rainstorms. Normally, days or even weeks of warning would be given prior to the flood crest on the river. During past floods, the river has remained above flood stage for several weeks. Flood levels of the Minnesota River at Chaska can be affected by backwater from high levels on the Mississippi River into which the Minnesota River empties about 30 miles downstream from Chaska. On East and Chaska Creeks, where an intense rainstorm could cause flash flooding within a few hours, little warning could be given. Runoff on the creeks would be characterized by high peak flows of short duration. There is some historical evidence (newspaper accounts) of flooding in July 1951.

Open waters in the East Creek watershed include two natural lakes, Hazeltine and Bavaria, and one recently constructed impoundment, Lake Grace (plate 1). Hazeltine is quite shallow and marginal for fish and is more suited as waterfowl habitat. Local interests have considered a dredging project in order to deepen Lake Hazeltine and make it suitable for a sport fishery. Lake Grace, which was recently impounded as part of the Jonathan development within Chaska, has a maximum depth of approximately 20 feet and is considered to have good sport fishing potential. The Jonathan interests are contemplating a second impoundment upstream from Lake Grace. The watershed of Chaska Creek includes Aue Lake, which is a small but deep fish lake with no public access, and a small unnamed lake located about 1.5 miles east of Aue Lake.

Lakes in the immediate project area include the following: ⁽¹⁾

a. Chaska Lake, designated as Carver County 10-4, has a surface area of 57 acres and a maximum depth of 2 feet. Chaska Lake is classified as a type IV wetland (deep marsh) by the Minnesota Department of Natural Resources.

(1) Minnesota Department of Natural Resources, Division of Game and Fish, Section of Technical Services, 1967. Special Publication No. 45, Metropolitan Lake Inventory.

b. A lake at the east end of Chaska is designated as Carver County 10-5 by the Minnesota Department of Natural Resources and is known locally as Trout or Courthouse Lake. This is, according to local persons, an abandoned clay pit and has a surface area of 10 acres and a maximum depth of 55 feet. It is located in a city park and is stocked by the Minnesota Department of Natural Resources with rainbow and brown trout. The lake is outside the existing levee and is bordered on the riverward side by floodplain forest.

c. Two small unnamed and unnumbered ponds are located immediately northeast of U.S. Highway 212 on either side of Minnesota Highway 41. The pond immediately west of the State highway has a surface area of about 6 acres and a maximum depth of about 40 feet. This water body has a small county recreation development but does not support a fishery. The pond east of the highway is similar in areal extent but is not used for recreation.

d. Gifford Lake, designated as Scott County 70-118, is a marginal fish lake subject to winter kill. Fishery management has been limited to winter rescue operation.

e. Nyssens (Strucks) Lake, designated as Scott County 70-116, is a type III to IV wetland, more suitable as waterfowl habitat than a producer of fish.

VEGETATION

Wooded and marshy areas for the East and Chaska Creek watersheds above the bluffs of the Minnesota River valley are given below in table 1. The figures were derived from U.S. Geological Survey quadrangles dated 1958.

Table 1 - Wooded and marshy areas in the East and Chaska Creek watersheds

Description	East Creek drainage		Chaska Creek drainage	
	Area (acres)	Percent of basin area	Area (acres)	Percent of basin area
Woodland				
Upland woodland	455	6.8	740	8.0
Lowland and ravine woodland	405	6.0	400	4.3
Total woodland	860	12.8	1,140	12.3
Total marshland	480	7.2	1,240	13.5
Lakes	309	4.6	88	0.9
Total woodland, marsh and lakes	1,649	24.6	2,468	26.7
Total area of drainage above the valley bluffs (including categories other than the above)	6,650		9,210	

The kinds of ecosystems occupying these acreages are described below.

THE MAPLE-BASSWOOD FOREST

The natural vegetation on the Chaska and East Creek watersheds was basically a maple-basswood forest, termed the "Big Woods" by the early settlers.⁽¹⁾ The species comprising this forest type are generally not resistant to fire although they are capable of developing under a forest canopy and perpetuating themselves, i.e., are components of the "climax" vegetation of the area, the end product of succession. Before man's fire control became effective, prairie fires swept into this region from the west and southwest. These fires maintained much of the vegetation in the region in prairie, oak savanna, or oak forest comprised of fire-tolerant and fire-dependent species. The Minnesota River, and to some extent the frequent smaller wetlands in the area, acted as natural firebreaks, however, and allowed development of the fire-sensitive climax vegetation on much of the Chaska and East Creek watersheds.

The dominant species in the maple-basswood forest is the sugar maple (Acer saccharum). This species is present in all size classes down to small seedlings which are very abundant on the forest floor. Sugar maple has the ability to persist for years in a slow-growing state in the deep shade under the forest canopy. When members of the overstory die, these suppressed sugar maples respond and fill the gap in the canopy. In time, then, sugar maple tends to become a more important component of the maple-basswood forest.

Codominant species vary as to locale but usually include basswood (Tilia americana). This species is sparsely distributed with typically one very large stem surrounded by several small sprouts from the root collar. Although the sprouts are not commonly members of the canopy, they will assume dominance upon the death of the main stem. Basswood seedlings are uncommon. The ecological niche of basswood, then, is that of a species which does not start new clones in an established forest, but rather it persists from earlier stages in succession due to its sprouting habit. If disturbance, such as fire, occurs in the maple-basswood forest, the above-ground portions of the plant may die, but the root collar sprouts profusely and maintains the clone, unlike sugar maple. Basswood, then, is important in this forest type but is not restricted to it.

(1) Daubenmire, R. F., 1936. The Big Woods of Minnesota; Its Structure, and Relation to Climate, Fire, and Soils. Ecological Monographs 6:235-268.

American elm (Ulmus americana) is also codominant. It cannot successfully compete with the sugar maple but is associated with temporary woodland pools. Apparently the elm is able to survive along the wet pool edges if the break in the canopy above is sufficient to enable it to develop.

Other tree species present include the northern red oak (Quercus borealis) and bitternut hickory (Carya cordiformis). These species appear to have an ecological niche similar to that of sugar maple but with a less ability to persist in a suppressed stage and to respond to openings in the canopy. Ironwood (Ostrya virginiana) may also be present as a small tree under the canopy.

The shrub layer is rather sparse in the maple-basswood forest, perhaps due to the influence of the dense overstory.

The herb layer is usually well developed although low in stature. Species present are those able to survive in deep shade and may typically include such species as hepatica (Hepatica acutiloba), catbriar (Smilax hispida), rattlesnake fern (Botrychium virginianum), maidenhair fern (Adiantum pedatum), and the putty-root orchid (Aplectrum hyemale). Wood nettles (Laporta canadensis) are abundant in some maple-basswood forests.

There is a considerable variety of animals present although they are mostly quite small. The soil meso- and macrofauna are usually present in far greater variety and number than in the oak forests in the area and include diverse forms such as various insects, spiders (Araneae), mites (Acarina), false scorpions (Pseudoscorpionida), millipedes (Diplopoda), land snails (Gastropoda), and earthworms (Oligochaeta). In the above-ground portions of the ecosystem, insects are also important. Although the fauna represents all classes of consumers - herbivores, carnivores, and decomposers - the decomposer group may be especially large in this climax forest with its trend toward stability, and balance of life and death.

Reptiles are not common in the maple-basswood forest but rather tend to be found in earlier successional stages, especially near wetland areas. The same generally holds true for amphibians although some, such as the common toad (Bufo americanus), are found. Temporary pools in the forest may harbor a considerable amphibian fauna during the spring breeding season.

The mammalian fauna is modest in this forest. The larger species such as whitetailed deer and red fox are present, although this forest is mainly important to them for cover while food is sought elsewhere. The smaller mammals include mice and squirrels although large populations of these species are usually associated with other kinds of ecosystems.

The avian fauna is diverse but typically includes few of the larger species except for the predatory birds which may nest here and feed elsewhere. There is a considerable variety of small birds such as the warblers, however, which feed upon the diverse insect fauna.

The maple-basswood forest, then, may be characterized as having a dense, well-developed overstory with a modest understory. In the long-established forest there is a continual capture of incoming energy, and the internal cycling of nutrients is relatively complex. The animal component is diverse but mainly of species of relatively small size, perhaps because the sources of food, except for that for the decomposers, is not at the same time large, nutritious, and available. In sum, the animal biomass is not large, but there is rapid turnover and energy flow with complex internal cycles.

The preceding paragraphs describe much of the Chaska and East Creek watersheds as they were. As will be discussed in the later sections on Land Use, Population, and Trends and Growth and Development, the ecosystems on the watersheds have been changed by man. The maple-basswood forest has been greatly changed; its soils are relatively deep and fertile (for forest soils) which make the soils useful in agriculture, while the sites on which the forest grows are uplands desirable for habitations and amenable to cultivation. Although there are a few natural or near-natural stands, this forest is now mainly represented by scattered woodlots, many of which have been pastured.

THE OAK FOREST

The oak forest may not have been originally very extensive on the Chaska and East Creek watersheds. It probably occurred under two conditions: (1) on slopes and hilltops which tended to be droughty, and (2) on the upland sites which by accident of location or fuel conditions tended to be prone to fire. Species characteristic of the oak forest are, as a group, species of the earlier stages of succession. They do not perpetuate themselves very well in the shade of a forest, particularly the deeper shade of the maple-basswood forest. They are more tolerant of open, droughty conditions and of disturbance, however. One such disturbance would have been fire in certain locations. The species in the oak forest tend to be fire-tolerant in that they often either have thick, fire-resistant bark or they sprout readily following fire. Because of their intolerance as regards germination and growth in the established forest, they also are, to some extent, disturbance or fire-dependent species.

The canopy in the oak forest is composed mainly of pin oaks (Quercus ellipsoidalis) and white oaks (Q. alba) and, in this area, tends to be incomplete in recent years due to oak wilt disease which kills a significant portion of the pin oaks in some areas. Several other species may be important in certain areas including box elder, (Acer negundo), black cherry (Prunus serotina), quaking aspen (Populus tremuloides), and paper birch (Betula papyrifera). These

four species are not as large and long-lived as the oaks, however, and typically occur in disturbed areas or, in the case of quaking aspen, occur in the initial stages of the advance of the forest into grassland. Basswood is also present, at least on the more moist sites.

The oak forest typically has a more developed understory than the maple-basswood forest, probably because the canopy is more sparse and interrupted. Saplings of the overstory species may be common if the canopy is sufficiently discontinuous. Species typical of other forests may also occur, such as American elm and green ash (Fraxinus pennsylvanica var. lanceolata). Shrubs also exhibit profuse growth and include species such as the dogwoods (Cornus sp.). The general aspect is of a forest with all size classes of trees and with a considerable undergrowth of shrubs, in contrast to the aspect of the maple-basswood forest of a tall forest with little undergrowth.

Herbaceous growth is usually quite profuse in the oak forest, at least where the competition with low woody growth is not too intense. The herbs exhibit quite a variety of growth forms and statures, and the herb layer presents an unkempt appearance in contrast to the more even range of sizes in the maple-basswood forest. Few species of herbs can be described as typical of the oak forest, but rather the herb flora is an assemblage of species from all stages of upland succession. A number of pioneering species such as various composites are usually found, and graminoid species may be important.

The soil meso- and macrofauna in the oak forest displays the same groups as that in the maple-basswood forest although the numbers of organisms per unit area are usually lower. The soil layers are thinner on the whole, and the organic layers are less well-developed and apparently less rich and productive.

The above-ground portions of the oak forest ecosystem display considerable diversity in the animal components. The oak forest gives the impression of being less lush and productive than the maple-basswood forest, but there are several well-defined strata in the vegetation which provide a considerably variety of ecological niches for animals.

The mammalian fauna typically includes more of the larger forms than are present in the maple-basswood forest. Both the grey and fox squirrels are present although the fox squirrel tends to be associated with, and forage in, croplands. Whitetailed deer appear to find the brushy oak forests to their liking, both for cover and for food such as browse and acorns.

The avian fauna in the oak forest is diverse and includes many species found in the maple-basswood forest. More of the low-level and early successional stage species are found, probably due to the greater development and variety of low woody vegetation. Some game birds such as the ruffed grouse may also be present.

In general, then, the oak forest can be characterized as having several well-developed strata of vegetation. It occurs on more severe sites than the maple-basswood forest and appears to be related to disturbance. It is usually thought of as a successional stage leading to the maple-basswood climax although the climax may never be attained on the more severe sites.

The oak forest ecosystem on the Chaska and East Creek watersheds has probably not been as adversely affected by man's activities as the maple-basswood forest. The steep slopes and hilltops where it originally was found are not heavily used for agriculture or habitation. On the less severe sites where it may have been maintained by disturbance, it probably has been cleared although the soils are not of high quality for agriculture. On parts of the watershed where the maple-basswood forest was disturbed - and those forests have been extensively disturbed, at least by logging - the oak forest may have increased in areal extent because of its relationship to disturbance.

THE FLOODPLAIN FOREST

Although there are several seral stages in development of a floodplain forest, only the more mature stages appear to be affected by the alternate plans described. Although members of this ecosystem advance up the valley slopes and species typical of the uplands invade this ecosystem, the floodplain forest is, by convention, restricted to the relatively flat valley floor and occurs on a substratum of silt with high mineral content and considerable organic matter. Thus, the site is rich, has been enriched by periodic flooding, and is rather moist.

The tree stratum is composed of cottonwood (Populus deltoides), American elm, silver maple (Acer saccharinum), green ash, box elder, and hackberry (Celtis occidentalis). Where an understory is present, such as in places where the canopy has been broken, the suite of tree species is roughly the same as that of the canopy. Although these species are characteristic of the floodplain, none of them can be considered to be restricted to conditions extant in the floodplain. For example, cottonwood becomes abundant shortly after the stabilization of river sandbars by various willows. It also is common as a seedling on disturbed sites with bare soil on uplands well removed from the river.

Silver maple and American elm display a good seedling density on disturbed upland sites when a seed source is nearby. Furthermore, all of these tree species are very hardy and grow well when planted in landscaping. Therefore, the tree flora appears to be restricted to the floodplain not by the conditions there but by an inability to compete with the upland vegetation. Further support of this hypothesis is afforded by the aforementioned restriction of American elm in maple-basswood forests to the edges of temporary woodland pools.

The shrub stratum in the floodplain forest is rather restricted and is confined to species typical of earlier stages of succession such as the willows. It may also reflect occasional colonization by upland shrubs.

The herb flora in the undisturbed floodplain forest is unimpressive in variety and is commonly composed of common and wood nettles. Under disturbed conditions a variety of species is found such as the wild cucumber (*Echinocystis lobata*), an indicator of floodplain conditions in the absence of an overstory. In disturbed areas quite lush herb growth occurs.

The wildlife species present are, with few exceptions, not confined to the floodplain. Perhaps most typical of the floodplain forest would be such species as the wood duck, which is not restricted to the floodplain per se, but finds high quality habitat near the river, in this case nesting cavities in large trees. Other species, such as certain of the herons, seem to follow the Mississippi and major tributary valleys northward. Other animal species, such as various insects and songbirds, apparently are present not because the area is floodplain forest, but because it is a forest.

The floodplain forest is very productive, and the vegetation seems to exhibit rapid growth. The basic productivity is probably maintained by the silt-laden flood waters.

THE PRAIRIE

There apparently was some natural prairie on the Chaska and East Creek watersheds. The prairie was probably maintained by fire since the climate in this region will allow the development of woody vegetation in the absence of disturbance. Because of the abundance of natural firebreaks in the area, the prairie was probably of limited extent.

The vegetation of the prairie was originally quite complex although the woody species were not important. Herbaceous species were dominant, notably the grasses, although the species list of other herbs is quite long, usually longer than the list of herbs in the forest. The vegetation is adapted to frequent fire which typically only kills the above-ground parts of the plants.

A number of animal species were characteristic of the prairies. Pocket gophers (Family Geomyidae), hog-nosed snakes (Heterodon nasicus), and meadowlarks are indicative. Other species, such as some of the dabbling ducks, reach greatest abundance when a prairie is nearby to fulfill a vital requirement, in the case of the waterfowl, nesting habitat.

Very little of the original prairie is still extant in the region, perhaps none on the Chaska and East Creek watersheds. The soils are typically deep and rich, and the early settlers found them productive of crops while they did not require clearing. This ecosystem is now either confined to the margins of wetlands or under cultivation or urban development.

THE WETLAND ECOSYSTEM

The wetlands are similar to the prairie in gross aspect and in the form of the dominant plants. In the zone where upland prairie meets the marsh, the demarcation between the two is difficult to define. Conspicuous plants include the grasslike cattails (Typha sp.) and sedges (Carex sp.). True aquatic vegetation, such as the pondweeds (Potamogeton sp.) and the unique bladderworts (Utricularia sp.), also may be found among the emergent cattails, bulrushes (Scirpus sp.), and sedges in places that have water year-round but are not subjected to strong currents and waves.

Wetlands are enormously productive, possibly because of plentiful amounts of water and nutrients. Measured primary production in some wetlands surpasses production on most uplands. Wetlands as a group have an important function as a nutrient sink, trapping nutrients in organic material and cycling them within the wetlands. The presence of these nutrients in open water ecosystems would increase the likelihood of excessive richness of the waters with concomitant algal blooms, but in wetlands the nutrients usually prompt increased productivity, not a disadvantageous (from man's point of view) change in the system. The wetlands also function as sediment traps.

Wetlands are also very productive of animals. A number of aesthetically desirable species such as marsh wrens, red-winged blackbirds, and herons find most or all of their habitat requirements there. The value of wetlands as producers of waterfowl for nonconsumptive aesthetic uses and for the hunter's gun is widely recognized. Some other species, such as the ring-necked pheasant, find the wetlands seasonally important for cover and food.

Commercially important fur-bearing animals in this region, the mink and muskrat, are associated with wetlands. Estimates of the mink harvest in the area are one animal per 1 to 4 square miles, and, like the muskrat harvest, reflect fur prices and not necessarily population levels.

As indicated in table 1, some 1,700 acres of marsh are found in the Chaska and East Creek watersheds. These marshes, being situated in an area of considerable agricultural activity and growing urbanization, have been reduced in diversity and areal extent by man. Wetland drainage, by and large, continues in agricultural areas. However, a theme of ecological balance is incorporated into the Jonathan development on the East Creek watershed. This is expected to preserve some wetlands in this upper watershed. Since a growing philosophy in urban development is to preserve "green belts", wetland preservation can be expected to continue. Preservation of wetlands will also preserve their values as wildlife habitat, as maintainers of water quality through their function as nutrient and sediment sinks, and as moderators and retardants of flash flood flows. Because of their unique values and because of their susceptibility to manipulation of water levels, wetlands are the most sensitive ecosystems on the watersheds.

Approximately 230 additional acres of wetland are confined to a bench east of Chaska between Carver County Highway 17 and Bluff Creek on the west and east and between Highway 212 and the valley bluffs on the south and north, respectively. (This figure of 230 acres appears to be the best available estimate. Other estimates have ranged from 200 to 275 acres). The Minneapolis and St. Louis Railroad bisects the wetland from west to east. The portion north of the railroad is a marsh with cattail, bulrush, and smartweed (Polygonum sp.) against the scenic background of the valley bluffs. South of the railroad, the wetland is a wet meadow, which may reflect the impact of the railroad embankment in shutting off the source of water. This wetland may be altered by one or more of three agents: (1) The Minnesota Department of Highways may, under one alternate plan, relocate Trunk Highway 41 through the marsh about a half mile east of the existing County Highway 17; (2) Real estate developers have indicated an interest in establishing commercial facilities in the vicinity with some development already occurring; and (3) The proposed route for diversion of flood flows of Fast Creek would cross the western end of this wetland. An unnamed creek flows out of the wetland and is bordered by willows (Salix sp.), alder (Alnus sp.) and red osier dogwood (Cornus stolonifera). Occasional clumps of shrubs are present throughout the wetland as well.

OPEN WATER ECOSYSTEM

Precious little information is available on the aquatic ecosystems, although about a sixth of the study area is in wetlands of various sorts. Generally, it is recognized that the natural regime in wetlands included periods of overabundance and dearth of water, and the biological components are tolerant of fluctuations in water level although permanent drainage is damaging.

Chaska Creek for about a mile below the bluffs of the Minnesota River valley passes through the urban area of Chaska. This section of the creek has been lined with riprap and concrete, and much of the streambank vegetation has been removed. The lack of shade in this lower portion of the creek may have materially altered its thermal regime. A more significant determinant of present conditions has been urban runoff in this lower portion of the stream. At present, this reach of Chaska Creek is degraded but may be expected to improve upon implementation of the policies promulgated in recent Federal water quality legislation.

East Creek has retained most of its natural character down to its confluence with the Minnesota River. The creek has been totally diverted during the past and once followed the bed of Bluff Creek to the east of Chaska. The present stream has developed a substantial cover of riparian vegetation for about 0.9 linear mile downstream from the Brandondale development (at the emergence of the creek from the bluffs of the Minnesota River valley). In the more urbanized downstream reaches of the creek, little of the natural characteristics remain. Streambank vegetation along most reaches shades the stream, and a normal complement of species probably occurs in East Creek, including herons which forage along the stream. The stream is implicated in flood protection by passing through about 1/4 mile of the old section of Chaska.

Courthouse Lake is in the floodplain outside the existing levee. It has no natural trout reproduction, but the Minnesota Department of Natural Resources periodically stocks brown and rainbow trout. It is therefore a locally significant recreational resource. During past floods on the Minnesota River, rough fish and debris have been washed into the lake necessitating cleanup and rough fish control. Rough fish control is normal in "put and take" trout lakes, however, as undesirable species are inadvertently introduced by fishermen's bait buckets, etc.

There are other floodplain lakes in the vicinity, but they are not in areas affected by the contemplated alternatives.

The Minnesota River bottom in the vicinity of Chaska is mostly shifting sand with some silt and a few areas of gravel and boulders. This sector of the river consists of approximately 60 percent bars and 40 percent pools. High temperatures range to above 80°F during the summer. Many springs with summer temperatures of approximately 48°F occur near the banks of the river channel. Most are so small that their cool temperatures affect only a small area of the river.

Most pools within the Minnesota River exist at the outside of sharper bends, and most of the fishery forage base is produced there. Flood flows during midsummer, turbidity, pollution, and excessively warm summer water temperatures are recognized as limiting factors for the river fishery. Spawning conditions for game fish vary from poor to fair. Although gravel and rubble are present, a greater share of the bottom is shifting sand, and the water is often quite turbid due to farmland erosion and sedimentation combined with silty soils. According to a Minnesota Department of Natural Resources fishery survey made in 1959, the following species were present: gar, buffalo fish, quillback, carpsucker, sucker, redhorse, carp, catfish, bullhead, northern pike, bass, sauger, walleye, sunfish, crappie, sheepshead, and various minnows. The tributaries of the river in the vicinity of Chaska offer little fish spawning habitat.

REGIONAL ECOSYSTEM

The ecosystems on the Chaska and East Creek watersheds have been discussed as though they could be clearly placed in one of the described categories. In reality, various gradations between the types exist. For example, the prairie and the oak forests were described. The oak savanna could be considered an intermediate type as it is basically a grassland with scattered trees, particularly the very fire-resistant bur oak. An increased intensity or frequency of fire would shift the balance against bur oak. Exclusion of fire, which is the present condition, shifts the balance toward more fire-intolerant species while the original old bur oaks would persist for a time.

There is also considerable interaction between the ecosystems described. An obvious interaction is the influence of tributary wetlands on creek flows. Also, the more motile species of animals utilize more than one type of ecosystem.

A more subtle interaction is the so-called "edge effect". This is an empirical concept which attributes to the ecotones, or transition zones between different kinds of habitat, a greater abundance and diversity of life. For examples, the ecotone between upland forest and wetland possesses the species of animals and plants common to each, as well as some species which are dependent upon the ecotone for their main habitat such as mink. Because of the diversity and activity associated with ecotones, these transition zones between habitats are extremely important in the ecosystem as a whole and are areas of considerable sensitivity.

LAND USE

Over 90 percent of the total land area in Carver County is in farms. This figure has been representative of the situation in the Chaska and East Creek watersheds until recent years. Development of the planned community of Jonathan, which is part of Chaska, is accelerating the urbanization of the East Creek watershed and part of the Chaska Creek watershed. Of the total 15,860 acres in the composite watershed, approximately two-thirds or roughly 10,000 acres are scheduled to be part of Jonathan. It is estimated at the present time that some 300 to 400 of those 10,000 acres have been converted to cultural development such as buildings, roads, etc. This leaves approximately 15,500 acres in farmland at present (including wooded areas and marshes).

In keeping with national trends, farm size in the county is increasing. The present average size of farms is 143 acres as compared to 127 acres in 1959. Corn is the most important crop, and alfalfa is second. Most of the farms have dairy or beef cattle.

The "Minnesota Soil and Water Conservation Needs Inventory" for 1971 indicates that the following would enhance agriculture in Carver County: drainage, strip cropping, terracing, contour plowing, sod rotation, annual cover, permanent cover, and pasture improvement.⁽¹⁾

The U.S. Department of Agriculture, Soil Conservation Service, made a field examination of the possibilities of constructing runoff retarding structures along the upper reaches of Chaska and East Chaska Creeks in 1967.⁽²⁾ Five potential sites were examined and are mentioned under plan 9 in the Alternatives section of this report. At the time of the field examination report, conservation needs for the composite watershed were identified as follows:

(1) Minnesota Soil and Water Conservation Needs Inventory. 1971. State Conservation Needs Committee, Chairmanship: USDA Soil Conservation Service.

(2) 1967. Field Examination Report, Chaska and Hazeltine-Bavaria Watershed, Carver Co., Minnesota

- a. Protection of 1,500 acres from sedimentation and flooding.
- b. Protection of 110 acres from erosion.
- c. Drainage of 2,300 acres (60 percent of which is non-cropland).
(Note that the present policy of the SCS is not to provide drainage assistance where the primary purpose is to bring new land into agricultural production).

The floodplain at Chaska consists of approximately 390 acres, including the areas behind the Minnesota River levee and along East and Chaska Creeks. About 34 percent of the floodplain is used for residential purposes, 18 percent is commercial property, 7 percent is occupied by streets and railroads, and 4 percent is public property. Vacant land, located mainly along East Creek, accounts for the remaining 37 percent of the total land area in the floodplain. The vacant area along East Creek is low and may be developed for recreation uses.

The estimated values of structures in the floodplain of the two creeks and behind the Minnesota River levee are \$11.5 million residential, \$1.0 million commercial, and \$2.7 million public, for a total of \$15.2 million.

POPULATION

The city of Chaska proper had a population of 4,352 during the 1970 census. This shows an increase of about 74 percent over the preceding decade. Most of the recent growth in population has been due to large annexations by the city. The Hazeltine area was annexed in 1963 and the Jonathan area in 1967. The population is expected to increase to about 80,000 persons by the year 2000 with most of the growth in the Jonathan unit. The total population of Carver County as of 1970 was 28,310. This is an increase of 32 percent compared to the 1960 population of 21,358.

ECONOMY

Employment in the city of Chaska increased from 859 persons in 1960 to 1,723 persons in 1970, an increase of 100 percent. Most of this increase has occurred in the Jonathan area rather than in the older part of Chaska. This is compared to an increase of 43 percent for Carver County during the same period. Agricultural employment has been steadily declining in recent years while manufacturing has

become the largest employer in the area. In 1970, employment in manufacturing and wholesale and retail trade represented 36 percent and 18 percent, respectively, of total employment for the city of Chaska. The third and fourth largest categories were services and construction, with 15 percent and 9 percent, respectively, as shown in table 2. Most Chaska residents are engaged in food processing and service industries or commute to the Minneapolis-St. Paul central area for employment.

Table 2 - Employment by industry sectors, Chaska, 1960-1970

Industry sector	1960		1970	
	Number	Percent of total	Number	Percent of total
Agriculture, forestry, fishing	20	2.33	-	
Mining	4	0.46	-	
Construction	103	11.99	152	8.82
Manufacturing	236	27.47	617	35.81
Transportation, communications, and other public utilities	37	4.31	85	4.93
Wholesale and retail trade	236	27.47	316	18.34
Finance, insurance, and real estate	20	2.33	103	5.98
Services	123	14.32	250	14.51
Public administration	39	4.54	59	3.43
Industry not reported	41	4.78	141	8.18

TRENDS OF GROWTH AND DEVELOPMENT

Chaska is one of the oldest communities in Minnesota, the village having been founded in 1854. In 1891, Chaska was incorporated as a city. Early growth was closely linked with the Minnesota River, and the community quickly became an important port. Later the river channel became commercially unnavigable due to silt accumulation, and Chaska ceased to grow. From 1890 to 1950, the population of Chaska remained stable at about 2,000 persons. As noted earlier the population increased after 1950 reaching 4,352 persons in 1970, most of the increase being due to large annexations by the city, the Hazeltine area in 1963 and the Jonathan area in 1967.

Growth and development in the Chaska area during the next few years are expected to far exceed the national average due to the development of the planned community of Jonathan (estimated population of 50,000 by the year 1990) in the northern part of the city, and the reconstruction of local highways. The population of Chaska is expected to increase from 4,352 in 1970 to about 80,000 in 2000, or an increase to approximately 18 times the present population. The East Creek watershed would be fully urbanized, and the Chaska Creek watershed would be nearly 50-percent urbanized. Floodplain zones above the bluffs of the Minnesota valley generally would be preserved as greenways. Floodplain below the bluffs and behind the levees would be fully developed.

TRANSPORTATION

The principal highway and railroad routes in Chaska are shown on the plates. The Minnesota Department of Highways is currently planning for the relocation of State Highway 41 and U.S. Highway 212, possibly as shown on plate 1. A 9-foot navigation channel with a 100-foot bottom width is current maintained by the Corps of Engineers to Minnesota River mile 14.7 which is downstream at Savage. Air transportation is provided through the general aviation airport at Flying Cloud Field in nearby Eden Prairie, with commercial flights available from Minneapolis-St. Paul International Airport about 20 miles east of Chaska.

A highway corridor location study for Trunk Highways 169, 212, and 41 has been made in the general vicinity of Chaska.⁽¹⁾ The recommended route for T.H. 41 would require an interchange for the relocated T.H. 41 and the existing T. H. 212 to be located in the vicinity of the 230-acre marsh on the east side of Chaska (see discussion of wetlands). The relocation is only an alternate proposal at this time because the Minnesota Department of Highways has not completed detailed studies of this route. Also, construction would not begin until some time after 1980, if ever. Federal Highway Administration (FHWA) draft environmental statements for location approvals on U.S. 212 and Minnesota Route 41 have been developed and were transmitted to the Council on Environmental Quality on September 27 and October 11, 1974, respectively. Another draft environmental statement is being developed for FHWA location approval on U.S. 169.

Rail service is provided by the Chicago, Milwaukee, St. Paul and Pacific Railroad and by the Chicago and North Western Railway.

WASTEWATER TREATMENT

The wastewater treatment plant at Chaska is owned and operated by the Metropolitan Sewer Board of the Twin Cities area. The plant provides secondary treatment and utilizes the contract stabilization process. This is a modification of the activated sludge process whereby activated sludge solids are stabilized by bacterial action under aerobic conditions. The plant was designed for a population equivalent of 7,500 persons and a flow of 0.75 million gallons per day.

(1) Howard, Needles, Tammen, and Bergendorf (Consulting Engineers), 1970. Corridor Location Study for Trunk Highway 169, 212, and 41. Prepared for the Minnesota Department of Highways.

The effluents are discharged to the Minnesota River, and the plant is situated just inside the existing flood control dike. Effluent conduits from the plant are not functional at river levels 17 feet over flood stage, and when this stage is exceeded, sewage effluent must be pumped over the dike with auxiliary equipment.

The Minnesota Pollution Control Agency standards of 25 milligrams per liter (mg/l) maximum biochemical oxygen demand (BOD) and 30 mg/l maximum suspended solids apply to effluents of the Chaska wastewater treatment plant. The Chaska wastewater treatment plant is loaded at approximately 75 percent of its design flow, on the average. Process efficiency has varied with effluent BOD values ranging from 10 to 74 mg/l and effluent suspended solids values varying from 23 to 127 mg/l. During the 11 months prior to January of 1972, the BOD effluent standard of 25 mg/l was met during only 3 months, and the suspended solids effluent standard was met during only 2 months. Both effluent standards were met during only 1 of those 11 months. Surveys of operation conducted in November and December of 1971 indicated some areas where modifications in operational practices would result in improvement in process efficiencies. These practices were instituted in January 1972 and, with the exception of one brief setback in February 1972, have been fairly successful. During January through November of 1972 BOD removal averaged 49 mg/l, and in the effluent, suspended solids averaged 80 mg/l, phosphorus 5.4 mg/l, and nitrogen 19.7 mg/l.

Plans for the future include an expansion of the Chaska plant in 1974. The Metropolitan Sewer Board indicates that the Chaska plant will be phased out when the expanded plant reaches capacity between 1985 and 1990. Wastewater would then be pumped to the regional Blue Lake treatment plant along the Minnesota River several miles east of Chaska.

WATER QUALITY

Water quality has been monitored since 1961 at a Minnesota Pollution Control Agency sampling station located on the Minnesota River near the U.S. Highway 169 bridge near Shakopee. Selected parameters of water quality from the Minnesota River station are as follows for the period of record:

Table 3 - Selected parameters of water quality (since 1961)

Parameter	Minimum	Maximum	Mean
Dissolved oxygen in mg/l	1.50	15	8.39
5-Day BOD in mg/l	0.50	40	6.35
Temperature in °F	31	81	55
pH	7.2	8.7	7.8

The figures for minimum dissolved oxygen and maximum BOD indicate periodic oxygen depletion. This occurs because point sources of treated wastewater and runoff of agricultural pollutants exceed the assimilative capacity of the Minnesota River. The reach of the Minnesota River adjacent to Chaska is presently covered by regulation WPC 5 of Minnesota Administrative Rules, Regulations, Classifications, and Water Standards as enforced by the Minnesota Pollution Control Agency. The standards have a minimum allowable oxygen level of 3 mg/l and a maximum 5-day BOD limit of 25 mg/l for effluents.

The Minnesota Pollution Control Agency has made two specific studies⁽¹⁾ on the feasibility of raising dissolved oxygen standards for the lower Minnesota River. The agency concluded that during the summer 5 mg/l of dissolved oxygen should be maintained in the river with existing standards of 25 mg/l BOD through 1985. However, it would not be possible to maintain a minimum dissolved oxygen level of 5 mg/l during winter when the river is ice-covered.

Water quality data are not available for Chaska and East Creeks. Since the areas drained by these creeks are predominantly urban and agricultural, there are probably oxygen-demanding materials and other pollutants present. Neither creek, however, appears to support heavy algal growths or to have objectionable odors or other adverse aesthetic or biological characteristics. Water quality problems may develop in the future from the few remaining dairy herd farmplots and the Jonathan beef herd farmplots within the watershed.

Sediment-producing banks are evident on the meandering creeks of the watershed. Erosion and sediment need to be controlled on new construction sites.

AIR QUALITY

Chaska does not have any noticeable air quality problems. Sulfation and dustfall have been monitored by the Minnesota Pollution Control Agency, and the following data (table 4) are taken from annual summaries furnished by the Division of Air Quality, Technical Services Section.

(1) Minnesota Pollution Control Agency, Division of Water Quality, 1971. Memorandum on Feasibility of Higher Dissolved Oxygen Standards for the Lower Minnesota River.

Table 4 - Data on sulfation and dustfall in Chaska, Minnesota

Year	Sulfation			Dustfall		
	Mean	Percent of Samples Exceeding Standards More than Half the Time (1)	Mean	Percent of Samples Exceeding Standards More than Half the Time (1)	Mean	Percent of Samples Exceeding Standards More than Half the Time (1)
1971 (2)	0.3 mg SO ₃ /100 cm ² /day	0	25 T/Mi ² /Mo	67		
1970	0.1 mg SO ₃ /100 cm ² /day	0	30 T/Mi ² /Mo	82		
1969	0.1 mg SO ₃ /100 cm ² /day	0	39 T/Mi ² /Mo	75		

(1) The applicable State standards are:

Sulfation - 0.25 milligram SO₃ per 100 square centimeters per day, maximum annual mean.

Dustfall - 15 tons per square mile per month, including background dustfall in all areas except those zoned for heavy industry.

(All means are arithmetic means).

(2) January - March only.

The city has no industry which would tend to emit air pollutants; however, considerable dust becomes airborne on surrounding farmlands, and some objectionable odors are occasionally emitted from the Gedney pickle plant.

SOLID WASTE

Solid wastes generated in Chaska are collected by local trash haulers and disposed of in the Louisville landfill just west of Highways 41 and 169 in Scott County, Minnesota. Some solid waste including abandoned autos is occasionally discarded in the Minnesota River floodplain.

FLOODS AND FLOOD DAMAGES

Flooding in Chaska has occurred frequently from high stages on the Minnesota River. The greatest flood of record occurred in April 1965 when a peak stage of 722.8 was reached. The 1965 flood essentially equalled the 1 percent flood. The 1969 flood reached a peak stage of 720.9. In 1952, a flood having a peak stage of 717.1 caused extensive damage. Other damaging floods occurred during the years 1881, 1919, 1936, 1943, 1944, 1947, 1949, 1951, 1957, 1962, and 1968. Backwater effects from the Mississippi River have contributed to some of the high flood stages at Chaska.

Extensive damages were sustained by residential, business, and city properties as the result of high stages on the Minnesota River at Chaska in 1952 and 1965. The 1965 flood caused damages estimated at \$2.3 million at February 1973 prices. In 1969, the existing levee and emergency action prevented damages of more than \$650,000. However, approximately \$440,000 in damages were sustained in 1969, principally as a result of interruption of highway traffic across the Minnesota River. Damage to private property was minimal.

Possible existence of past floods on Chaska and East Creeks has been studied through newspaper accounts and interviews of older community residents. Local newspaper articles refer to floods on the creeks in July 1951. There is no record of a flood on or after 8 July 1955 which is the date of the maximum rainfall recorded at Chaska. A flood on the creeks would cause damage under present conditions since overflow from either or both creeks could pond behind the existing emergency levee to depths exceeding 15 feet. Also, recent residential and commercial developments have been rapidly encroaching onto the floodplain of East Creek on a terrace below the bluffs of the Minnesota River valley. High flow on East Creek would cause extensive damage in this terrace area.

In the absence of recorded flood damage data for the two creeks, certain assumptions were made to estimate the flood damage potential. For the area behind the existing levee, it was assumed that floods of equal severity and frequency would occur on both creeks simultaneously. Flows in excess of channel capacities would pond in the area behind the existing levee when they exceeded the capacity of the outlets through the levee. Several floods were routed through this area in a model, and a frequency-elevation relationship was determined. Flood damage potential for the overflow area along East Creek was determined using computed flood profiles.

Average annual equivalent flood damages from floods on the river and the two creeks were derived by correlating discharge-damage and discharge-frequency relationships. These damages are estimated at \$306,000 at February 1973 price levels.

EXISTING FLOOD CONTROL PROJECTS

No Federal project for flood control has been constructed at Chaska. The existing Corps of Engineers Lac qui Parle project near the head of the Minnesota River is too far upstream to significantly reduce flood stages at Chaska.

A levee built by the city following the 1952 flood provided protection against a 20-year frequency flood with 3 feet of freeboard. This levee, with its crest at elevation 720.0, was overtopped in the spring of 1965 by more than 2 feet. The 1965 flood exceeded the stage of the 1952 flood by about 5 feet. Following the 1965 flood, the levee was restored by the Corps of Engineers under the emergency operation authority of Public Law 99 and was subsequently raised about 4 feet by the city. The levee was again raised, about 2 feet, prior to the 1969 flood. This raise was accomplished with the assistance of the Corps of Engineers, again through Public Law 99. The existing levee, although discontinuous, is tied into high ground at both ends at a top elevation about equal to the level of a 3 percent flood.

LOCAL RECREATION AND AESTHETICS

The city of Chaska has established public park and recreation facilities at Chaska Lake, Trout or Courthouse Lake, and several other locations. Facilities are available for ball playing, picnicking, fishing, swimming, and band concerts. The Chaska general plan includes an open space program which would be a system of greenbelt corridors along natural drainageways. The corridor would be continuous with the Minnesota River Valley trails system which is presently being developed by the Minnesota Department of Natural Resources.⁽¹⁾ The planned trail system would run along both banks of the Minnesota River upstream of Chaska and along the right (south) bank downstream of Chaska. The plan also includes purchase of the floodplain lands in the area for open space/recreation uses.

(1) "A Plan for Recreational Trails in the Minnesota River Valley," January 1969. Itasca Engineering Inc., 12401 Minnetonka Boulevard, Hopkins, Minnesota 55343.

HISTORY AND ARCHEOLOGY

Carver County, established 20 February 1855, was named for Captain Jonathan Carver, an English explorer and author. At the time of colonization, the area was occupied by Sioux Indians.

An inventory of historically or archeologically significant sites in the vicinity of Chaska was provided by the Minnesota State Historical Society. Those sites located in the vicinity of Chaska are listed as follows:

Mounds and Earthworks

a. W 1/2 of NW 1/4, Section 9, T 115 N., R 23 W. In the public square at Chaska. Three tumuli mounds. (Winchell, 180-181).⁽¹⁾

b. SE 1/4 of SE 1/4, Section 9, and SW 1/4 of Section 10, T 115 N, R 23W. A group of 69 mounds 100 feet above the river bottom (Winchell, 191).

Oliver Faribault Post at Chaska

Located at the present site of Chaska. Further research is needed to determine the exact site. Faribault was operating a fur post and a large farm here in 1842.

Thomas A. Holmes Post

Located at the present site of Chaska. This post was established in 1851.

Mission of St. Francis Xavier

Located on the left (west) bank of the river at Chaska. The mission house was built by Father Augustin Ravoux in 1843. After one year, the mission was closed, and the chapel was ultimately dismantled and shipped to Wabasha.⁽²⁾

(1) Winchell, N. H. "The Aborigines of Minnesota," Minnesota Historical Society, St. Paul, Minn. 1911.

(2) Sister Mary A. Norton. Catholic Missionary Activities in the Northwest, 1818-1864. pp. 78-79.

Mr. Edward Weinzierl, local historian with the Carver County Historical Museum at Waconia, Minnesota, was consulted as to possible locations of historic or archeologic sites near Chaska. He knew of no additional sites.

The "National Register of Historic Places"⁽¹⁾ does not list any historical sites in Carver County, and no sites in the Chaska area have been nominated to the register at the present time.

3. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

INTRODUCTION

The upgraded and extended levee, interior drainage provisions (including temporary ponding), and creek diversion which are proposed for Chaska would impact upon the economic, social and biological portions of man's environment. Certain of the effects would be temporary, lasting only for the duration of construction activity, or shortly thereafter. Other effects would last as long as the structures remained in place. It is quite likely that the structures would be maintained far beyond the 100 year economic lifetime of the project.

IMPACTS UPON CLIMATE, GEOLOGY, SOILS AND GROUNDWATER

The proposed plan of flood control for Chaska is not expected to impact significantly upon the climate, geology, and soils of the area. Some temporary dust is possible during construction depending upon the weather. This problem would be partially controlled by using water trucks for sprinkling. Most of the spoil from excavation of the bypass and diversion channels would be used in levee construction and in placing overburden in areas along the levee for landscaping. Also, material could be spoiled in the drained 30 acres of wetland. The site(s) for disposal would be provided by the local sponsor.

A localized impact upon the groundwater may occur, but is not expected to be significant. Artesian pressure occurs in pervious material in the Minnesota River floodplain. Excavation into this pervious material may allow relief of the artesian pressure with resulting sand flows. The pressure usually dissipates rather rapidly. This could occur along the East Creek bypass channel. An assessment of the probability of this occurrence would require further investigation. Extension of the levee would involve excavation only in impervious material and thus should not impact upon groundwater.

(1) U.S. Department of Interior, 15 March 1972.

IMPACTS UPON SURFACE WATERS AND BIOLOGICAL SYSTEMS

Significant downstream effects on the Minnesota River and its floodplain would not occur because any increase in peak flows from East and Chaska Creeks would not produce sufficient water volumes to noticeably increase downstream flood stages on the Minnesota River. Any floodplain constriction resulting from the levee work at Chaska would be minor, and measurable alteration of upstream or downstream flood stages is not likely to occur.

The proposed diversion of Chaska Creek would substitute a rock-and concrete-lined channel for about a mile of stream, some of which has been straightened and lined with concrete and riprap in the past. The diversion channel, in time, would develop characteristics similar to those of the modified portions of the existing stream bed. The portions of Chaska Creek which are now in a near-natural condition would experience, upon channelization, a decrease in their life-support capabilities and in their aesthetic value. The hydraulic efficiency of the stream channel would be increased as compared with existing conditions.

The bypassed portion of the existing Chaska Creek channel would serve interior drainage under the proposed plan. As part of the requirements for local participation, the local sponsor would either have to leave the channel unaltered or would have to provide substitute interior drainage.

The proposed flood bypass for East Creek would eliminate flood stages from the existing stream and its floodplain, but low flows would be maintained.

The construction activities associated with implementation of the selected plan would result in at least temporarily increased sediments for Chaska and East Creeks. These activities might not result in significant impacts upon the Minnesota River because the flood bypass for East Creek and the diversion channel for Chaska Creek would likely be constructed under relatively dry conditions. The installation of the control structures would result in some sedimentation of the creek. The associated reduction in the productivity and diversity of the biological system would affect a modest, but locally significant, food web including algae, aquatic invertebrates, small fish, and herons.

The increased sedimentation would depend upon such factors as streamflow at the time of construction, rainfall, and the use of devices for silt retention (which could be incorporated into the specifications). The sediment load would decrease downstream as suspended material gradually settled out. Suspended and

settled material downstream from construction areas would limit or prevent light from reaching photosynthetic bottom flora, thereby reducing their productivity. Except under very unusual circumstances precipitation and resultant runoff from construction sites would also cause sedimentation and turbidity in recipient bodies of water.

Aquatic invertebrates may be affected through burial by sediment and hinderance of their ability to feed and respire. Fish, being more mobile, could leave the affected area but the likelihood of their doing so is not very high, even though suspended materials irritate and injure their gills. These impacts could be decreased by timing construction during the late summer low flow period and by using appropriate silt detention devices. Adverse effects of sediment on the hatching of fish eggs could also be alleviated in this way.

Basically the magnitude of impacts from sedimentation cannot be predicted because sedimentation depends upon unpredictable variables such as streamflow and weather. The effects would extend downstream for an undefined distance.

The diversion of Chaska Creek would result in the loss of aquatic organisms within the present creek bed. Part of this section of the creek has been modified in the past and, in time, the diversion channel would probably support a flora and fauna similar to that of the present creek. However, in constructing the Chaska Creek diversion, 2.5 acres of young elm and box elder, as well as 10 to 15 willows of 4 to 6 inches in diameter, would be lost. Besides their values for aesthetics and wildlife habitat, some of this vegetation screens nearby residences from the sight and sounds of a railroad and highway.

As noted earlier, the part of Chaska Creek which is now in a near-natural condition would be channelized. Although the food web in these reaches of stream is moderate, the stream's conversion to a flood control channel would create a much less productive and diverse ecosystem. Some of these effects could be avoided by constructing a stilling basin as soon as the channel passes the baseball field on the essentially level Minnesota River floodplain. This would shorten the channel by more than 500 feet and lessen damages to the floodplain ecosystems and stream. However, the channel would have to be relocated because of encroachment from the widened levee base.

The bypass channel for East Creek would cut across the west end of a 230-acre wetland. About 30 acres of this wetland has been partially drained by private interests, and the bypass channel would complete that drainage. This would have profound effects on that

wetland area. Eventually, a less diverse and productive ecological balance with an altered species composition would be expected. However, private drainage of this area is now taking place, and the area is zoned for commercial and industrial use. If the 30 acres were used for spoil disposal, destruction of the wetland ecosystem would be final and development encouraged.

The bulk of the wetland, or about 200 acres, would lie to the east of the bypass channel. In the absence of further study, a definitive judgment cannot be made as to the effects of the channel on that area. However, some observations are possible, and they point to some adverse effect although the magnitude and significance cannot be adequately assessed.

The wetland has a steep slope (a drop of about 10 feet within a mile), drains to the east or away from the channel, and is underlain by relatively impervious soils on its western end. The slope away from the channel and the relatively impervious soils should keep surface and subsurface drainage to a moderate level and localized at the west end of the wetland (adjacent to the channel). Also, the project plans are aimed at minimizing such drainage since a low impervious dike and impervious cutoff would be installed between the channel and the 200-acre wetland.

However, a factor which would lower the water table in the 200-acre wetland is the cutoff of water recharge from the west. This would be likely because the wetland decreases in elevation from west to east, and the bypass channel would intercept recharge at that "upstream" end. Also, the wetland has a steep slope making it dependent upon regular recharge. The recharge area which would be removed by the bypass channel is a relatively small portion (about 3 percent) of the wetland's watershed, however, and the interception of runoff should have a small effect, if any. A greater threat to the wetland's recharge would come from cutting underground aquifers. Examination of the topography and present knowledge of the geology of the area leads one to the conclusion that the effect would be small, if any. However, definitive judgments would require further study.

The conclusion which may be reached is that there would be some undefined, but probably limited, effect on the 200 acres of wetland. Indirect adverse effects due to alteration of the project, such as constructing side ditch inlets, should not occur since local interests must get prior approval from the Corps for such alterations.

If the water level in the wetland were lowered, as is possible but not likely to exceed a few inches, the wetland ecosystem would be adversely affected. This particular wetland would quite visibly be affected because the wetland is generally a wet meadow with scattered

shrubs over large areas and has standing water on only a portion of its area. A drop in the water level would greatly speed succession and convert the area into a less productive and less valuable shrub swamp.

The proposed route for the relocation of Highway 41 would be immediately to the east of the channel. The deep fills required for the highway embankment would tend to block drainage from the east of the highway unless culverts or some other drainage device were installed. Blockage in this case might be beneficial if it maintains the marsh. The relocation cannot be depended upon because the Minnesota Department of Highways has not studied the desirability of this route in detail, although it appears to be the best from the consultant's report. Also, the proposal is a result of a corridor study which evaluates the possibilities for a strip of land perhaps 2,000 feet wide. The highway relocation has high regional priority, but construction would not begin until some time after 1980, if ever.

Upgrading and extending the levee would result in the loss of about 10 acres of wetland interspersed with bottomland trees. New levee construction would also remove some existing dump landfill from the floodplain thereby reducing the potential for water pollution. This potential for pollution would at some time in the future be virtually nonexistent since natural decomposition would slowly remove or neutralize the potential pollutants. Although the potential for pollution would be reduced, disturbance of the landfill during construction would allow at least temporary pollution. The net effect of removal of the landfill should then be neutral.

The proposed levee alignment would protect Courthouse Lake from flooding by the Minnesota River. However, the lake would be utilized as a secondary ponding area in the event that heavy rainfall occurred while the Minnesota River is above flood level and the primary pond was approaching capacity. Ponding could also occur due to heavy runoff from the spring snowmelt. There would be a control structure between the primary pond and the lake to reduce the frequency of use of the lake as a ponding area.

The impacts of the project on the lake are difficult to predict. On the one hand, protection from the Minnesota River would prevent influx of silt, large debris, and large rough fish. On the other hand, utilization as a ponding area could result in less silt and large debris, but there would be introductions of small fish and increasing amounts of pollutants from the increasingly urbanized East Creek watershed. The lake would not be used as a ponding area as frequently as it would be naturally flooded by the Minnesota River, and thus the impacts would probably be positive for the immediate future. In the long run the frequency of occurrence

and quality of heavy runoff from the creek watersheds would balance that positive impact to an unforeseeable extent.

As discussed in the section on the existing environmental setting, the floodplain ecosystem evolved with periodic flooding. Prevention of flooding is expected to impact on this ecosystem. The beneficial fertilizing effect of the silt-laden flood waters would be lost, and some loss in productivity would likely occur. Also, the species composition of the ecosystem may be altered. As discussed earlier, the floodplain has some species typical of the uplands. Periodic flooding may have prevented their attaining the abundance found in upland areas or may have prevented their being found in the floodplain altogether. This check would be lost, and the floodplain ecosystem would likely become more like the uplands in composition. These changes would occur only after many years and would be important primarily along the portion of East Creek that would be protected from flooding. However, there would also be smaller areas within the proposed levee which would experience similar impacts.

IMPACTS ON LAND USE

Future land use on the uplands of the Chaska and East Creek watersheds will shift from agriculture to urban development as discussed in the Land-Use section of this statement. Such development would not be affected by the proposed project in the judgment of some individuals while others feel that the existence of the project would release upstream land owners from the moral responsibility to retain water on their land as long as possible. The implication for land use is that under the release of responsibility landowners would feel no constraint against undertaking measures contributing to downstream flooding such as wetland drainage, and such measures would be encouraged by the proposed project. Planning by the Jonathan Development Corporation provides for maintenance of wetlands in the upper East Creek watershed. Major drainage requires approval from the Minnesota Department of Natural Resources whose current policy is not to permit such actions.

About 150 acres of land in the floodplains of Chaska and East Creeks are undeveloped as are about 5 lots in the floodplain of the Minnesota River. This area is subject to floodplain regulation. As will be discussed in the Alternatives section, floodplain regulations limit the location and types of development, require certain building codes, etc. Since such regulations would not be required under State law upon implementation of intermediate regional flood protection and since the city would probably not want to continue unusually restrictive developmental regulations which would be no longer required, floodplain regulations would probably be lifted as a consequence of the proposed project.

About two thirds of the undeveloped 150 acres would be designated as future greenbelt and open space under Chaska's plan for the city. This would presumably be done, and the project would have little effect on that acreage, the effect being primarily biological impacts due to the absence of flooding.

The project would have greater effects on the other one third of the undeveloped 150 acres. That acreage is presently zoned for residential, commercial and industrial development. The relative freedom from developmental restrictions resulting from the proposed project would probably encourage greater development, or at least allow somewhat different kinds of development. For example, floodplain regulations preclude construction and landfill in a designated floodway on each side of the stream channel. This would keep development an appreciable distance back from the stream while local interests would certainly like to use such land. Much of this acreage would probably not lie within the floodway. A second example would be building codes. Building codes for floodplain regulations specify structural measures which minimize flood damage. Since such measures would not normally be built into structures, they would constitute an extra expense and probably would not be undertaken in the absence of requirements. Implementation of the proposed plan, then, would allow greater freedom of development. It is obvious that such freedom would be accepted, and the kind and amount of development would differ from that without the project. Project benefits claimed in the economic analysis include flood proofing cost savings to new development and to redevelopment and increased land utilization, in addition to flood damage reduction benefits.

IMPACTS UPON THE SOCIAL SETTING AND THE ECONOMY

The proposed plan has a benefit-cost ratio of 1.3 and would reduce average annual flood damages at Chaska about 88 percent. Total first costs of the project at February 1973 price levels would be \$9.54 million, of which \$1.53 million would be non-Federal. The costs and benefits would accrue to both residents of the floodplain and the larger non-resident public. The non-resident public may protest that the benefits are false benefits, that the costs and benefits are the result of floodplain development that never should have been. That point of view has merit. However, one must recognize that comparison must be made between the with-project conditions and the existing conditions, not between with-project conditions and what might have been. As was discussed in section 2 of this report, Chaska became established at a time of logical association with the river. Although hindsight indicates that the development in the floodplain which followed Chaska's fall from importance as a port was unwise and that such developments had little functional tie to the river or creeks, development of the floodplain at Chaska exists. Although the merits of fostering development may be debated at length, it is normal for a community to want to

grow and expand. It is also normal for man to be attracted to his own kind and to the centers of business. The situation exists, then, and must be recognized. Economical rectification of the situation of having unrealted, non-functional, and non-conforming land uses in a floodplain is properly the province of future action, e.g., judicious floodplain management. The proposed plan is also a future action, the rationale in this case being technically removing the floodplain from the area instead of removing development having high damage potential from the floodplain.

Approximately 390 acres of urban area, including about 540 homes and 47 businesses, would be protected against the 100-year flood. A few undeveloped properties would be severed, and about 13 residential relocations would be required for the project. The residences taken would include 6 semipermanent mobile homes near the beginning of the East Creek bypass channel, 3 houses at the intersection of the East Creek bypass channel and Stoughton Avenue, and 4 homes near the levee along the Minnesota River. About 20 acres of land zoned for industrial and commercial uses would be required for the channels.

An improved social setting would result from the residents' perception of safety and lack of worry and anxiety during flood seasons. The word "perception" is appropriate because large, low-frequency floods could breach or overtop the structures. An additional benefit would be the elimination of community disruption during floods less than an intermediate regional flood. The economic portion of this benefit is claimed in the benefit-cost analysis. Local property maintenance efforts could intensify with the implementation of flood protection although the general appearance of Chaska is one of a well-maintained community.

The proposed plan would require the evacuation or relocation of 13 residences. Considering the present liberal policy of the Federal Government toward relocation assistance, no serious inconveniences or hardships would be imposed upon those required to relocate, assuming that they are willing to do so. Any person who would be required to relocate and did not desire to do so would be adversely affected by the proposed plan. In this case the adverse effect would be unavoidable.

An adverse social impact would be due to the noise and inconvenience caused by construction activities. These impacts should not differ from those associated with any large-scale project.

IMPACTS UPON SOLID WASTE DISPOSAL, SEWAGE TREATMENT, AND PUBLIC HEALTH

The proposed plan would not affect solid waste disposal. Sewage treatment would be affected very little if at all since the Chaska wastewater treatment plant is scheduled to be phased out during the period 1985-1990 which would roughly correspond with the date of completion of the project.

The generally unsanitary living conditions which accompany flooding would decrease in the short term. However, the potential would increase under the proposed plan because there would be more development in the protected area in the future. This potential would be realized only in unusual circumstances such as malfunction of the structures or an extremely severe flood, however.

IMPACTS UPON RECREATION AND AESTHETICS

The proposed levee modifications should not have substantial impacts on the recreational and aesthetic qualities of the floodplain. The recreational quality of Courthouse Lake as regards sport fishing should change very little since the project would have minimal impact on the trout fishery. Construction of trails around and near the lake would improve the access for recreation in that area. The aesthetic setting of the lake would be less desirable inasmuch as the surroundings of urban area and levee would be substituted for levee and floodplain forest. The view from the Carver County Courthouse would improve with removal of the emergency levee, however.

The trail system along the levee would generally be an improvement over the present trail since it would be paved and the levee would have warps and landscaping. Paving would encourage use by bicycles and should reduce conflicts between motorized vehicles and cyclists. Along some reaches of the levee, such as the western part fronting on the river, the aesthetic setting of the trail would be less desirable because a view of the channel would be substituted for a view of the existing riparian vegetation. Accessory berms and landscaping would improve the basic appearance of the levee relative to what it is now, however. The contouring would also decrease the impact of straight lines on the landscape. The landscaping would also improve the appearance of the existing unkempt, bare earth levee system near Courthouse Lake.

The recreational impacts of the diversion and bypass channels would be slightly negative. Although the proposed plan does not presently incorporate trails or other recreational features along the channels, trails along the channels have been proposed. Such trails would as likely be installed without the project as with the project, however, because a trail system is incorporated into Chaska's plans for the city. There would be some decrease in informal recreational opportunities, such as nature study, due to the loss of certain wetland and floodplain forest areas. The aesthetic impacts of the channels would be negative due to their physical nature (size, straight lines, riprap, concrete lining, drop structures, etc). However, tree and shrub planting is presently planned to remedy such defects to the extent possible.

Local interests have indicated that the proposed channels would be incorporated into Chaska's plans for greenbelt corridors and open space and that landscaping and trail plans would be desirable to the community.

IMPACTS UPON HISTORICAL AND ARCHEOLOGICAL SITES

The mounds and earthworks or historic sites known in the vicinity of Chaska would probably not be affected by the project. However, as noted earlier, the exact site of the Oliver Faribault Fur Post is not known. This site could possibly be disturbed. Investigation into the location of this site would be required during postauthorization study with salvage or protection undertaken as appropriate.

4. UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED ACTION

The unavoidable adverse impacts of the proposed plan include the elimination of about 10 acres of floodplain ecosystems in levee construction, the loss of several natural systems in the path of the diversion and flood bypass channels, degradation of about a mile of stream, the displacement of 7 homes, and 6 trailer homes and some secondary effects.

Construction activities would cause some dust and sedimentation of water bodies. The seriousness of these adverse impacts would depend upon unpredictable factors such as streamflow and weather at the time of construction. Construction would also cause noise and inconvenience for community residents.

The diversion channel for Chaska Creek would result in disruption of aquatic life within the present creek bed. Parts of the creek bed have been modified in the past, and parts support a healthy stream ecosystem. The effects of the project would be most serious in the latter case. About 2 1/2 acres of young elm and box elder woodland would be lost in the proposed route as would 10 to 15 willows of 4 to 6 diameter. Another 5 acres of presently undeveloped land would be required for the channel.

The East Creek flood bypass channel would convert about 15 acres of agricultural land and natural systems to flood control works. Because the channel passes through the end of a 230-acre marsh, it presents the probability of complete drainage of about 30 acres which are now partially drained and the likelihood of some adverse effect on at least part of the balance.

Upgrading and extending the existing levee along the Minnesota River would cause the loss of 10 acres of wetland interspersed with bottomland forest. There would be some indirect impacts in that area and along the East Creek floodplain because the lack of flooding would reduce the productivity and alter the species composition of the floodplain forest.

The levee and channels would result in topographic modifications which would divide properties. Development in the floodplain areas would in all probability be stimulated. Residences taken for the East Creek channel would include 6 semipermanent mobile homes and 3 houses, and the levee work would require removal of 4 homes.

Some negation of aesthetic and recreational qualities would be associated with the structures.

5. ALTERNATIVES TO THE PROPOSED ACTION

INTRODUCTION

A comprehensive and effective plan for managing the floodplains of a particular river basin or locality would logically include one, or a combination, of the following nonstructural and structural measures:

a. Nonstructural measures. -

- (1) Flood warning systems.
- (2) Permanent floodplain evacuation.
- (3) Flood proofing of existing or new structures.
- (4) Flood insurance.
- (5) Floodplain regulation.

b. Structural measures. -

- (1) Reservoir storage.
- (2) Levees and floodwalls.
- (3) Channel modifications or diversions.

From the above measures, 14 plans of flood-damage reduction were developed for Chaska. These alternative plans are considered in the following paragraphs. The major environmental impacts of each plan are discussed, as well as the potential of each plan for solving the flood problems at Chaska. The plans were analyzed based on a 100-year amortization period, a 5 5/8 percent interest rate, and February 1973 price levels.

NONSTRUCTURAL ALTERNATIVES

Plan 1. - A flood forecasting and flood warning system is presently available for the Minnesota River through the National Weather Service and the St. Paul District, Corps of Engineers. However, little warning could be given if intense rainfall caused a flash flood on East and Chaska Creeks. With this alternative the anxiety and worry experienced by local residents during flood seasons would remain as would the community disruption which occurs during actual floods. Also, the questionable structural integrity of the existing levee system and flash flood potential of East and Chaska Creeks impose a risk of economic damage and potential for loss of life in the community. This alternative would not eliminate the possibility of flooding and loss of life from possible failure of the Highway 41 embankment should floodwaters pond behind it. Accordingly, flood forecasting and flood warnings with subsequent emergency actions are considered an important feature of any flood protection plan but individually would not solve Chaska's flood problem. Reliance upon this alternative would require floodplain regulation under State law (see plan 5).

No significant adverse impact to the biological portion of man's environment can be ascribed to this alternative.

Plan 2. - Total floodplain evacuation would require removal of about 544 residences (including a few which could experience basement flooding), 47 businesses and industries, and three public buildings currently within the floodplains of the Minnesota River, East Creek, and Chaska Creek. The estimated cost exceeds \$21 million, and the benefit-cost ratio is calculated to be 0.6.

The city of Chaska feels that social, institutional, cultural and physical problems make this alternative completely impractical. The city also feels that community cohesion would be severely disrupted and long-standing sociological and historical ties would be lost. Sociological aspects of floodplain evacuation also include the potential problem of alienation of relocated persons from their community. A recent study of that problem concluded that: (1) The relocated groups did not have significantly different feelings of alienation toward the community as compared with unaffected groups;

(2) Forced relocation did not consistently lead to personal alienation from the changed community; and (3) Negative attitudes among the affected groups were directed against the agent of change and not against the community per se⁽¹⁾. These findings suggest that, while evacuation would be difficult for a community to accept, social cohesion might not materially suffer. Perhaps the adversity would foster community solidarity as is shown by communities in time of natural disasters such as floods and tornadoes. The evacuation alternative would seem to be consistent with the public's evolving attitude toward human occupancy of the floodplain. Although human occupancy has long been assumed to be the best and highest use of the floodplain, public responses to the Water Resources Council's proposed Principles and Standards⁽²⁾ indicated that this is not in the best interest of overall land management. The responses indicated a strong desire to restrict development in the floodplain and, in fact, suggested that the Federal Government withhold monies for water and land-development projects where the floodplains are "violated."

A modification of this alternative would involve evacuation of one or two of the three floodplains and other nonstructural or structural measures for the remaining flood-prone areas. For example, the newer flood-prone homes (but not the majority of homes) are generally within the East Creek floodplain. Protection of that area and evacuation of the remaining flood-prone areas, however, was found to be economically infeasible and is not included in this analysis.

It should be pointed out that floodplain evacuation with regulation is the only plan which would give immediate permanent protection from flood damages within the regulatory floodplain. Although this plan appears to be undesirable to residents of the floodplain, future, as well as current, residents would benefit through the true absence of worry and the elimination of a perpetuating problem of operation, maintenance and replacement of flood-control structures. This alternative is the only one which immediately attacks the basic problem, which is floodplain development, not flooding. Like the proposed plan this plan would largely eliminate economic damages caused by interruption of commerce during floods.

The environmental impact of this alternative need not be severe and could be positive. Relocation onto uplands could be done in such a manner as to result in a community which would be very desirable to live in and one which would be in harmony with environmental features. The impacts upon the floodplain could be beneficial as the area could return to more diverse and productive natural conditions. This would

(1) Napier, T.L. 1972. Social - psychological response to forced relocation due to watershed development. Water Resources Bulletin 8(4): 784-794.

(2) United States Water Resources Council. July 1972. Summary and Analysis of Public Response to the Proposed Principles and Standards for Planning Water and Related Land Resources and Draft Environmental Statement. pp. 110-112.

depend upon how the evacuated floodplain would be used. Use for auto parking would be less beneficial to wildlife than use as a playground which would be less beneficial than use for a park, and so forth. Use of the floodplain for open space/recreation (gain in parkland about 100 acres) would require no flood protection and would at the same time offer a great deal to the general public. There would also be no urbanized intrusion into the area proposed as part of the Minnesota River Valley trail system. Conversion of the floodplain to a use having small flood damage potential would be consistent with the principles advanced by several levels of government. Although the community could be relocated into a biologically sensitive area, in general, through sensitive planning and execution, there would be positive wildlife benefits, and probably significant ones. This would certainly reduce the need for compensatory measures as compared to the proposed plan.

The physical setting of Chaska, particularly in view of projected trends in population and development, would render evacuation a reasonable alternative. Chaska is a relatively old community dating back to 1854. It developed at a time when the Minnesota River was an important route for shallow-draft navigation. The community was located on the river to take advantage of the transportation, and it became an important port. When the river was no longer commercially navigable, Chaska ceased to grow and had a stable population of about 2,000 from 1890 to 1950. As noted earlier in this report, most of the increase in Chaska's population since 1950 has been due to large annexations by the city. The old section has also grown, but much of this growth has probably been due to the old section's function as a business district for the metropolitan suburban area above the bluffs. The old section of the city has probably also grown as a suburban area in its own right.

At this time, and in the future, Chaska's dependence on the river will be slight. The city uses wells for its water supply, and it is not now an important port, nor may it ever be again. The community would not depend upon the river for wastewater disposal if the Chaska treatment plant is phased out in 10 to 15 years as planned by the Metropolitan Sewer Board. At the same time, the most significant growth in Chaska is expected to occur in the Jonathan Unit (and probably other areas above the bluff).

These factors would probably render the old section of the city less important in Chaska's future except perhaps as a political center. Jonathan in particular is expected to have most of the growth in population and economic factors. This would make floodplain evacuation a very reasonable choice. Although this alternative would immediately attack the basic problem and would be ecologically sound, local interests

have indicated it to be socially undesirable (although it may be very desirable to the larger non-resident public). As now presented, the plan does not have economic feasibility although other avenues could be explored, e.g., accomplishing floodplain evacuation as part of an urban renewal program. Conversion of the area to a use such as recreation/open space would adversely affect the tax base. The tax base would not be totally lost since the developments would essentially move, not be completely eliminated. Operation, maintenance, and replacement of flood control structures would be unnecessary.

Plan 3. - Flood proofing involves structural modifications of developments to reduce the potential for flood damages. Such modifications might include seepage control, sewer adjustment, permanent closure, protective coverings, protection for openings and interiors, watertight caps, proper anchorage, underpinning, timber treatment, deliberate flooding, structural design, reorganized use, appliance protection, utility adjustments, roadbed protection, elevation or raising, temporary removal, rescheduling, and proper salvage. These measures would be easiest to apply to new buildings under construction and could be required in building codes, subdivision regulations, etc. Application to existing buildings would be more difficult, in part because most structures are not designed to withstand high water pressures.

Flood proofing measures could not be applied to all structures because of their design limitations and because the potential depths of water in some parts of the floodplain would be too great. Such structures would have to be removed. Removal would be required on about 80 acres, and the land could be used for less damage-prone land uses such as parks or parking lots.

The cost of this alternative would exceed \$19 million, and the benefit-cost ratio would be 0.6.

Impacts associated with the plan would be appreciable. Biological impacts would be positive on the whole and would be similar to those of floodplain evacuation, but on a smaller scale. Viewed from the biological perspective, this plan would be preferable to the structural plans (with the possible exception of small headwaters reservoirs) and to the other nonstructural plans (except for evacuation and possibly floodplain regulation and flood insurance).

Some social impacts of flooding would remain, such as disruption of transportation and potential dangers to public health and safety. Social benefits would primarily involve reduction in flood damages to structures and contents. Adverse impacts of this plan would include the inconvenience and disturbance of construction, the required removal

of some structures and auxiliary items such as landscaping and shade trees, and appearance of the community (such as the "perched" appearance of raised buildings). Some of these impacts would not be severe in comparison with other plans. For example, the appearance of flood-proofed buildings should be no less desirable than that of flood control structures, while the evacuated areas could serve as parks, etc.

Plan 4. - The National Flood Insurance Program was created to curb the continually increasing annual losses from flood damage. According to the National Wildlife Federation, ⁽¹⁾ it was meant to be an alternative to structural programs and a method for reducing direct Federal disaster relief. For structures already existing in the floodplain, up to 90 percent of the premium is paid by the Federal Government. In the case of Chaska, limited amounts of flood insurance are available at subsidized rates anywhere within the Chaska city limits on structures built prior to 24 March 1971. Additional coverage is available at actuarial rates for structures in areas subject to flooding from the Minnesota River if built prior to that same date. Coverage at actuarial rates is also available for new construction along the Minnesota River. Coverage can also be obtained on contents of the buildings.

However, participation in this federally subsidized program has been low; a total of 72 properties in Chaska were protected by the insurance as of April 1973. Thus, flood insurance has not received broad-based local acceptance since less than 15 percent of the flood prone structures have been insured.

The lack of acceptance is due to the nature and intent of the program. The payment of full actuarial rates for new development in the floodplain would in many cases be prohibitively expensive, and thus participation is discouraged. The intent of the actuarial rates is to internalize the risks of floodplain development, that is, make those who would develop the floodplain pay the full costs of that development (instead of having Federal subsidies through some other type of program such as disaster assistance or structural flood control).

Another reason for lack of acceptance is that before a community may participate in the program, it must adopt and submit to the Secretary for Housing and Urban Development for approval a comprehensive zoning and land use plan for the floodplain.

(1) National Wildlife Federation. 8 June 1973. Conservation Report. Number 21. p. 290.

As should be obvious from the low participation rate in Chaska, the flood insurance program is totally voluntary. Although it is very sound in concept because it would internalize risks and costs of floodplain development, voluntary participation has rendered it ineffectual because a community's desire to develop its floodplain and its ability to obtain disaster relief presumably outweigh any motivation the community might have to get flood insurance. Stronger incentives to participate in the program would come into existence under a recently introduced bill (H.R. 6524).

As noted in the opening paragraph of this section, the full benefits of flood insurance are presently available only in the Minnesota River floodplain. The entire program is not available for the floodplains of Chaska and East Creeks because the engineering data needed to determine insurance rates in those areas were not available earlier. This study by the Corps will provide the needed data; thus, all provisions of the flood insurance program could be extended to the floodplains of Chaska and East Creeks.

Because flood proofing and floodplain regulation would be required for participation in a flood insurance program, the impacts of this alternative would basically be similar to those of plans 3 and 5. The economic and social impacts for Chaska would probably be greater under this plan since it would internalize the costs of floodplain development more than any other plan would. The public not residing in the floodplain would correspondingly experience the smallest adverse social and economic impacts with this plan. The small impacts for the larger public would be due to the nature of the program which, for example, does not allow Federal disaster relief for insured properties. This would reduce Federal costs to Federal subsidy of insurance payments while the developer would pay full actuarial rates for new development. As the existing structures became obsolete and were replaced, Federal participation through subsidy would disappear. Therefore, this plan would probably be the most desirable plan for the larger non-resident public.

Plan 5. - Floodplain regulation would shape land use and development in the floodplain so as to lessen the damaging effects of floods. The regulatory approach is comprehensive and in general agreement with the goals expressed by the Federal flood insurance program, the Water Resources Council report, and the courts generally.⁽¹⁾ The goals include protecting life, minimizing public expenditures, and preventing or reducing flood damage to property. The cited report finds there is also general agreement that land use in frequently flooded areas can be severely restricted to non-damage prone uses such as open space, agriculture, storage, parking and playgrounds. Less frequently flooded

(1) Kusler, J. A. and T. M. Lee. 1972. Regulations for Flood Plains. American Society of Planning Officials. 68 pp.

areas can be opened to more damage-prone development provided that first floor elevations are subject to special uses and structural controls.

Zoning is an important part of floodplain regulation. An aspect of zoning, which at the same time prevents damages to structures and prevents backwater effects from development, is to not permit encroachment into the designated floodway. Designation of the floodway and related regulations would not allow construction or landfill between the boundaries of the channel which is reasonably required to convey floodwaters. Zoning ordinances can also regulate the floodplain areas outside the designated floodway by specifying elevations below which certain types of development cannot be constructed.

Subdivision regulations are also an important part of floodplain regulation. These regulations are used by the local government to specify the manner in which a tract of land may be divided. They may state the required width of streets, requirements for curbs and gutters, size of lots, elevation of land, freedom from flooding, size of floodways, and other points pertinent to the welfare of the community. Not only can public health and welfare benefit, but various municipal costs such as maintenance of street and utilities can be reduced during flood periods. Subdivision regulations are primarily applicable to presently undeveloped areas.

Building codes set forth construction standards for the purpose of protecting the health, safety and general welfare of the public. A well-written and properly enforced building code can effectively reduce damages to buildings in the floodplain. A few of the requirements which should be specified in a building code to reduce flood damages are:

- a. Prevent flotation of buildings from their foundations by requiring proper anchorage.
- b. Establish basement elevations and minimum first-floor elevations consistent with potential floods.
- c. Require structural strength to withstand either water pressure or high velocity of flowing water.
- d. Restrict the use of materials which deteriorate rapidly when exposed to water.
- e. Prohibit equipment that might be hazardous to life when submerged, such as chemical storage, boilers, or electrical equipment.

Building codes would then include basically the same items and philosophy as alternative 3, flood proofing. Building codes are most applicable to new development or redevelopment, and flood proofing, to existing structures.

Wise day-to-day policy and action to prevent construction of streets and utility systems in undesirable areas would deter damage-prone development in floodplains. Floodplain exploitation can be discouraged and development toward higher ground can be encouraged by locating street improvements, schools, and other public facilities elsewhere.

The city of Chaska, in cooperation with the State of Minnesota, implemented in late 1971 a program of floodplain regulation along the Minnesota River within the city. The Corps of Engineers report now available for Chaska provides the necessary engineering data to extend regulation to the floodplains of East and Chaska Creeks. Under State law the regulations must now be written and adopted.

With the use of the floodplain regulation alternative for Chaska, expected average annual flood damages remaining within Chaska would exceed \$800,000 because of current urban developments. There would thus be high residual damages under present conditions with probably a reduction in damages with time. The benefit-cost ratio would be 2.6. Floodplain regulation would, however, restrict development in the floodplain, thereby reducing and, if appropriate regulations were drafted, ultimately eliminating flood damages. In any case, floodplain regulation would be a necessary supplement to structural flood control measures. In the case of the proposed plan, floodplain regulation would be required in the areas designated for interior drainage and in the residual floodplain (see plate 3). Upon implementation of the proposed plan, floodplain regulation could, and likely would, be lifted from the protected floodplain areas.

Although this alternative lacks local support, it has potential for directly attacking the basic problem of development in the floodplain. It also is the only alternative besides evacuation which has potential for effecting a hazard-free solution for all floods up to the regulatory flood. The social and economic impacts of this alternative would primarily rest on those living or doing business in the floodplain. Because regulation would restrict their activities, it would not be desirable to them. This alternative would be relatively more desirable to the city since the non-floodplain residents would experience fewer impacts than with the structural plans, with floodplain evacuation, or possibly with flood proofing. However, this alternative could adversely affect the city's tax base. A decrease in the tax base

would somewhat balance the advantages gained by the non-floodplain city residents although the expected future growth above the bluffs would render this consideration less important in the future. Impacts on the larger, non-resident public would be positive because the costs of floodplain development would be in large part internalized while the basic problem would be scaled down in the long run.

The impacts on the biological portions of man's environment would be positive on the whole and would be similar to that of plan 2, although, the length of time required for the effects would be longer with this plan.

The floodplain regulation alternative would be consistent with the intent of the 1969 Minnesota Flood Plain Management Act which stresses nonstructural measures in solving flood problems, but does not preclude traditional projects.⁽¹⁾ The Act declared that "the floodplains of this state are a land resource to be developed in a manner which will result in minimum loss of life and threat to health, and reduction of private and public economic loss caused by flooding."

Effective floodplain regulation requires careful evaluation of the flooding potential and the determination of the effects upon flood flows of future floodplain use. These engineering determinations require technical expertise and information which most communities do not have. In response to this need, the State of Minnesota, the U.S. Geological Survey, and the Corps of Engineers all have programs to assist communities in instituting sound floodplain management.

STRUCTURAL ALTERNATIVES

Plan 6. - This plan includes the diversion of Chaska Creek around the heavily developed areas of Chaska and the construction of a flood bypass for East Creek. The plan is essentially the proposed project without modification of the existing levee and interior drainage facilities. The benefit-cost ratio is 1.9 and average annual flood damages would be reduced by about 72 percent.

Environmental impacts of this plan were discussed earlier as part of the proposed project. The parts of the earlier discussion dealing with the diversion and bypass channels would apply also to this plan.

Since the existing levee would not be upgraded and extended, about 100 acres of the Minnesota River floodplain would remain subject to possible flooding because the existing levee is of questionable structural integrity (although it is nearly high enough) and because the discontinuous tie-back to high ground would be overtopped by a

(1) Wright, J. M. 1973. Plain talk about floodplains. The Minnesota Volunteer 36(206): 39-44.

3-percent flood. Structures on those 100 acres include 284 homes, 18 businesses, two public buildings, streets, roads, and public utilities. These structures would then be jeopardized in the event of levee failure, inadequacy of emergency action during flood periods, or very large floods on the river.

Like the proposed plan this alternative would complete drainage of 30 acres and have an undetermined, but probably limited, effect on another 200 acres. The possibility could be essentially eliminated by using an alternate route for the East Creek bypass which would begin slightly downstream of the proposed diversion structure. This route would essentially straighten the proposed route from just above the Brandondale bridge to the west edge of the Gedney pickle factory. From that point, it would follow the proposed route to the edge of the floodplain terrace. This alignment would require evacuation of fewer homes, would shorten the channel length by a fourth to a third, as well as eliminate the possibilities of affecting the 230-acre wetland. This alignment would cause increased division of properties relative to the selected plan if Highway 41 were relocated as proposed. Because of the uncertainty of that relocation, that adverse impact may never occur. The cost of land for the straightened alignment would be higher, but this would be more or less balanced by lower costs for the shorter channel and for fewer relocations. Although the overall costs may not change materially, the changed costs would be borne by different sectors of the public. A straightened alignment would involve a greater cost for Chaska (which must purchase any land required for the project) while the cost to the Federal Government would be lower (through lower construction and relocation costs).

Other diversion routes would destroy the natural features of East Creek (alternate routes 4 and 5) or result in the certain drainage of the 230-acre marsh (routes 1 and 2). Route alternatives 1 and 2 were unacceptable to the city of Chanhassen through which they would pass.

Plan 7. - This alternative constitutes upgrading and extension of the existing levee combined with upgrading of interior drainage facilities. The plan is essentially the proposed project without a diversion and bypass for the creeks and would give intermediate regional flood protection from the Minnesota River.

Environmental impacts of levee modification were discussed earlier as part of the proposed project.

The benefit-cost ratio would be 0.5, and average annual flood damages would be reduced by about 16 percent. The high residual damage results from no protection against possible flash floods on East and Chaska Creeks which could overflow and fill the leveed area from the landward side. In addition, this plan includes no protection for

urban development along the Chaska and East Creek floodplains. Construction has been particularly heavy within the East Creek floodplain where some 100 new homes have been built during recent years. Because of the high residual damages, this alternative would not be a complete solution to Chaska's flood problems

Plan 8. - This alternative is a combination of plans 6 and 7, comprises the proposed plan, and is discussed elsewhere in this report. The benefit-cost ratio is 1.3.

Plan 9. - The construction of four headwaters reservoirs at sites studied by the USDA Soil Conservation Service in the East and Chaska Creek watersheds could reduce intermediate regional flood peak flows in Chaska by approximately 40 percent. Peak flows from lesser floods would be reduced by a relatively greater amount. The benefit-cost ratio would be 0.9, and average annual flood damages in Chaska would be reduced by about 29 percent. Some 600 acres of land, including 100 acres of cropland and 400 acres of wetland, would be used. The use of dry dams as proposed would conflict with Jonathan Development Corporation plans to construct small, fixed-pool, recreation reservoirs primarily for aesthetic purposes. Depending upon the duration of flood storage, periodic inundation of the marsh areas would lead to little biological damage as marsh ecosystems have evolved in the presence of fluctuations in water level including periods of overabundance.

A plan of headwaters reservoirs including 2- to 5-foot conservation pools could be implemented in such a manner as to improve the production and diversity of wildlife in the composite upper watershed. However, peak discharges on the two creeks would not be substantially reduced, and flood damage from the Minnesota River and the creeks would remain. Although flood damages would be reduced, this plan would not give 100-year flood protection to Chaska.

Plan 10. - The four headwaters reservoirs of plan 9 could be combined with the essential features of the proposed plan to provide intermediate regional flood protection for Chaska. The levee and interior drainage portions of this plan would be identical with those of the proposed project while the diversion and bypass channels would be smaller, commensurate with the flood storage capacity of the upstream reservoirs. The reduction in flood damage would be the same as that for the proposed project while the cost of this alternative would be \$3.35 million greater, yielding a benefit-cost ratio of 1.0, considering all flood control and related benefits. Environmental impacts of this plan would be a combination of those for plans 8 and 9.

Plan 11. - A large earth-fill dam on each creek where the creek empties into the Minnesota River valley would provide intermediate regional flood protection from Chaska and East Creeks. The benefit-cost ratio would be 0.7, and flood damages at Chaska would be reduced by about 70 percent. The flood control reservoirs would require the relocation of major trunk sewer lines, a heavily used county road, and several residences. Approximately 70 acres of heavily wooded stream valley would be lost, and a planned creek greenway system would be severed. The existing flood control capabilities of the levee system along the Minnesota River would remain unaltered.

Plan 12. - The two large reservoirs described in plan 11 could be combined with the levee improvements of plan 7 to provide intermediate regional flood protection for the community. The benefit-cost ratio would be 0.7 and 88 percent of the flood damages at Chaska would be eliminated. Environmental impacts would be a composite of those described for plans 7 and 11.

Plan 13. - Approximately 2.5 miles of channel modification of East and Chaska Creeks constitute this plan. The creek beds would be enlarged, deepened, and refinished using riprap, concrete or combinations of these materials. The benefit-cost ratio would be 1.5 and 70 percent of the flood damages would be removed. Substantial ecological changes within and along the creeks, particularly along East Creek, would occur. Twenty-five acres of shading riparian forest would be lost, and marsh areas adjacent to the stream would be drained. The large channels required would be aesthetically displeasing and difficult to maintain. Approximately 26 residences and three businesses would require relocation, and every bridge in the old section of Chaska would have to be replaced.

Plan 14. - The channel modification of East and Chaska Creeks (plan 13) could be combined with the levee improvement of plan 7 to provide intermediate regional flood protection for Chaska. The benefit-cost ratio would be 1.2 considering all flood control and related benefits, and flood damage reduction would be 88 percent. Environmental impacts would be a composite of those from plans 7 and 13.

NO ACTION

Normally, the "no action" alternative would entail unrestricted development in the floodplain and no structural measures to prevent flooding. This does not apply to the situation at Chaska because the community now has structural protection against floods on the Minnesota River although the existing levee is of questionable structural integrity and has an inadequate tie-back to high ground. Also, unrestricted

development is not possible under State law. Minnesota law requires that communities in the floodplain either have protection against the intermediate regional flood or institute floodplain regulation consistent with State standards. Thus the "no action" alternative is not available to the city of Chaska; it must upgrade its flood protection or maintain regulation of the Minnesota River floodplain and extend regulation to the creek floodplains. The environmental impacts of this alternative would then be those of plan 5, floodplain regulation, and would be dictated by the specific standards which Chaska would adopt within the State guidelines.

6. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

For purposes of benefit-cost analysis, the proposed action must be regarded as a short-term use of man's environment. It is expected, however, that the flood control structures and the urban developments protected by them would be maintained beyond the official project life of 100 years. The short-term benefits would consist of avoidance of adverse economic and social impacts of floods equal to, or of less magnitude than, the intermediate regional flood.

Expanded occupation of the floodplain would impair the natural high productivity of the wetland and floodplain areas involved. This would be traded for short-term economic and social gain. The biological tradeoffs are more clear-cut, involving use of the very productive lowlands instead of the more common, less sensitive, and less productive uplands.

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION

Hydrocarbon fuels and planning and construction efforts invested in the project would not be retrievable. Natural systems displaced by project structures would be essentially irretrievable, including some 10 acres of interspersed wetland and floodplain forest along the levee alignment, 2 1/2 acres of young forest and 10 to 15 willows of 4- to 6-inch diameter along the Chaska Creek alignment, about a mile of Chaska Creek, some 3 to 5 acres of wetlands along the East Creek diversion channel, some 20 acres of upland along the 2 channel routes, and possibly some other systems if secondary effects occur. For practical purposes the natural resources used in building the structures would also be irretrievable.

There would also be a commitment to continuing, and possibly increased, development in the floodplain. Thus, there would also be a commitment to perpetuation of the basic problem.

8. COORDINATION WITH OTHERS

Environmental inputs of various Federal, State, and local government agencies, as well as the views of interested local individuals, were solicited during the interim survey study of flood problems at Chaska. Federal and state agencies were informed of the initiation of investigation and have been contacted during development of the plan on phases that would affect their interests. Meetings with a locally organized citizens' advisory committee were held during the investigation to include local preferences and desires in the plan. In Chaska City Hall on 21 November 1972, a public meeting was held to acquaint agency representatives and the public with the areas affected and the progress of the study. In mid-May 1973 a draft environmental impact statement was prepared and sent, with a request for comments, to the following agencies, groups and individuals:

- U.S. Environmental Protection Agency
- U.S. Department of Commerce
- U.S. Department of Interior
- U.S. Department of Agriculture
 - Soil Conservation Service
 - Forest Service
- U.S. Department of Health, Education and Welfare
- U.S. Department of Housing and Urban Development
- U.S. Department of Transportation
- Office of Economic Opportunity
- National Weather Service
- Upper Mississippi River Conservation Committee
- Minnesota Department of Natural Resources
- Minnesota Department of Highways
- Minnesota Pollution Control Agency
- Minnesota State Planning Agency
- Minnesota State Park Commission
- Bell Museum of Natural History, University of Minnesota
- Fresh Water Biological Institute, University of Minnesota
- School of Forestry, University of Minnesota
- Minnesota Historical Society
- Southern Minnesota River Basins Commission
- Southern Minnesota River Watershed District
- Metropolitan Council, St. Paul
- Metropolitan Sewer Board, St. Paul
- County Engineer, Carver County
- Carver County Agricultural Extension Agent
- Hennepin County Park Reserve District
- Mayor, city of Chaska
- Chaska City Manager
- Mayor, village of Chanhassen
- Minnesota Environmental Defense Council, St. Cloud
- Minnesota Environmental Resources Defense Council, Minneapolis
- Environmental Library of Minnesota

Jonathan Development Corporation, Chaska
Sierra Club, Northstar Chapter, St. Paul
Environmental Science Center, Golden Valley
Environmental Information Center, Inc., New York, N.Y.
Center for Urban Encounter (CUE), St. Paul
Clear Air-Clear Water Unlimited, South St. Paul
Minnesota Environmental Education and Research Association, St. Paul
Minnesota Environmental Control Citizens Association (MECCA),

St. Paul

Izaak Walton League of America, Minnesota Division, Minneapolis
Northern Environmental Council, Duluth
Environmental Concerns, Inc., Edina
Minnesota League of Women Voters, St. Paul
Soil Conservation Society of America, Minnesota Chapter, Willmar
Minnesota Public Interest Research Group (MPIRG), Minneapolis
Minnesota Conservation Federation, Hopkins
National Audubon Society, Red Wing
Minnesota Federation of Women's Clubs
National Campers and Hikers Association, Minneapolis
The Nature Center-Carver Park, Excelsior
Minnesota Pheasants Unlimited, Minneapolis
Ducks Unlimited, Minneapolis
Federated Garden Club of America, Minnesota Chapter, St. Louis Park
Minneapolis Bird Club, Minneapolis
Minnesota Association of Conservation Education, Minneapolis
Minnesota Futurists (World Future Society), St. Paul
Minnesota Lakeshore Property Owners Association, Minneapolis
Assumption Seminary, Bloomington
Chaska Citizen's Advisory Committee:

Mr. Al Klingelhutz
Mr. Cy Ess
Mr. Randy Christianson
Ms. Luella Schmitt
Mr. Danny Klingelhutz
Mr. C. A. Lubansky
Mr. Ben Lind
Mr. Doug Bade
Mr. C.D. Gibson
Mr. Marvin Diedrick

Mr. George Wenzel, Chaska
Chicago and North Western Transportation Company, St. Paul
Chicago, Milwaukee, St. Paul, and Pacific Railroad, Minneapolis
Dr. Daniel E. Willard, Institute for Environmental Studies,

University of Wisconsin, Madison

Mr. Jonathan P. Ela, Sierra Club, Madison, Wisconsin

On 7 June 1973 a late-stage public meeting attended by about 50 people was held in the First National Bank Building in Chaska. Several

individuals, including representatives of local government and citizen groups, expressed a need for the project, requested expediency in subsequent project planning and execution, and declared their support for the project. Representatives of local businesses desired changes in the project so as to minimize the project's impacts on local properties and businesses. Representatives of citizen groups and agencies indicated a concern for wildlife habitat in the area and outlined compensatory measures which would be required to offset losses.

Comments on the draft statement were received from the following agencies and citizen groups: Copies of the letters can be found in Appendix A.

U.S. Environmental Protection Agency
U.S. Department of Interior
U.S. Department of Agriculture
Soil Conservation Service
Forest Service
U.S. Department of Transportation
Federal Highway Administration
U.S. Coast Guard
Minnesota Department of Natural Resources
Minnesota Department of Highways
Minnesota Pollution Control Agency
Minnesota State Planning Agency
Minnesota Historical Society (Office of the State Archaeologist)
Mayor, city of Chaska
Sierra Club, North Star Chapter
Minnesota Bird Club

The ensuing pages outline the Corps' response to comments received.

1. United States Environmental Protection Agency. -

Comment. - The EPA has classified their comments as category ER-2 which means that they have environmental reservations regarding the project and believe that more information should be provided to fully assess the environmental impacts.

Response. - The revised draft will hopefully provide sufficient information.

Comment. - Refers to drainage of portions of a 200-acre wetland. The revised draft should discuss the value of the wetland and the amount of wetlands that would be affected by lowering the water table.

Response. - The wetland is about 230 acres in area. About 30 acres have been partially drained by private interests, and the flood

bypass channel would complete the drainage. The other 200 acres might be affected by the project as outlined in the section on Impacts upon Surface Waters and Biological Systems. The values of wetlands as moderators of flash floods, nutrient and sediment traps, aesthetic resources, and producers of organisms for consumptive and nonconsumptive uses are discussed in the section on the Wetland Ecosystem.

Comment. - Development on the East Creek floodplain would be possible if the structural flood control measures meet State standards. If the design flood were exceeded, greater losses would then occur.

Response. - The East Creek bypass channel would pass a one percent flood flow with 2 feet of freeboard. All along the channel sufficient additional freeboard above channel freeboard is available to pass the standard project flood. The project would then meet State standards (which require one percent protection), and development would be allowed on the East Creek floodplain under State law. A very large flood could damage that development.

Comment. - The environmental impact statement (EIS) should discuss the feasibility of the proposed project if floodplain regulation were also adopted.

Response. - Under the proposed plan floodplain regulation would be required in the residual floodplain and temporary ponding area (see plate 3). Continuation of floodplain regulation in protected areas would in time substantially reduce potential flood damages and greatly reduce the need for a project. Since many of the benefits would be removed under continued floodplain regulation, the economic justification for the project might be jeopardized.

Comment. - The disposal of unsuitable and excess excavated materials should be described. If the 30 acres of drained wetlands would be used for a disposal site, the EIS should discuss the ultimate use of this site and the effects upon adjacent wetlands.

Response. - Much of the unsuitable and excess excavated material would be placed in overburden areas along the levee and used as a foundation for landscaping. Investigations have not progressed sufficiently to determine if the 30 acres would be used for a disposal site. Should this be done, the site would probably be used for industrial development. Adjacent wetlands would not be affected by spoil disposal since they would be on the opposite side of the bypass channel.

Comment. - On page 48 under "Impacts upon Surface Waters," the EIS states that there may be some secondary impacts on the river if the water quality of the influent water from the creeks is lowered. The statement should be expanded to explain how this would happen.

Response. - The discussion has been expanded and is in the section entitled "Impacts upon Surface Waters and Biological Systems."

Comment. - The EIS states that the East Creek bypass channel will not significantly lower the water table in 200 acres of the 230-acre wetland which it traverses. Since even slight changes in the water table could alter wetland characteristics, the EIS should estimate the extent the water table will be lowered and describe the impact upon the wetland ecosystem. Also, secondary impacts, such as inducement of private drainage and land development, should be discussed.

Response. - The section on "Impacts upon Surface Waters and Biological Systems" has been expanded to more comprehensively evaluate the possible impacts in question. While none of the foreseeable agents would substantially lower the water table, small changes are possible. Since even slight changes in the water table could alter wetland characteristics, an adverse impact upon the wetland ecosystem is recognized as possible even though the probability and extent of such change cannot be adequately evaluated at this time. One secondary impact, that relating to the 30 acres of drained wetland, has been discussed in the statement. The possibility of induced drainage in the rest of the 230-acre wetland by such means as side-ditch inlets is recognized in the above-referenced section of the EIS.

Comment. - EPA wetlands policy is quite explicit in stating that wetland areas are of major ecological value and consequently require extraordinary protection from development. The construction of the East Creek diversion channel will have a deleterious effect on portions of a 200-acre wetland area, and modification of project measures to minimize the degradation of the quality of this wetland should be seriously considered.

Response. - As shown on plate 3, the East Creek bypass channel would go east before heading south. If it went straight from its inlet structure to U.S. Highway 212, it would avoid the 230-acre wetland entirely as well as have a minimal effect on the wetland's recharge area. The economic and social aspects of such a straightened route are discussed as part of alternative plan 6.

Comment. - The EIS should discuss the secondary effects of the project on upstream wetland drainage. Since the degree of flooding at Chaska will be decreased, landowners upstream may be relieved of the necessity to decrease downstream flood flows. The result could be an increase in wetland drainage and its corresponding adverse effects.

Response. - The same point has been raised by the USDI Bureau of Sport Fisheries and Wildlife in its letter of 1 June 1973. The merit of that judgment would be a crucial part of coordination with the Bureau on Fish and Wildlife matters. See section on Impacts on Land Use.

Comment. - The proposed levee would protect Courthouse Lake from flooding by the Minnesota River. However, the lake would be used as a ponding area for runoff from East Creek while the Minnesota River is at flood stage. Since it is expected that the East Creek drainage area will become fully urbanized, the quality of this urban runoff could have undesirable effects upon the water quality of Courthouse Lake. The effects of urban runoff upon the water quality of Courthouse Lake and its present use as a "put and take" trout fishery should be discussed.

Response. - Impacts on Courthouse Lake have been more fully discussed in this revised draft and are covered under "Impacts upon Surface Waters and Biological Systems."

Comment. - Plan 5, the alternative on floodplain regulation appears to be a viable solution. It would be a more effective solution to the problem, and it would be more environmentally compatible and economically feasible. Based on the information provided in the Draft EIS and the Interim Survey Report, we believe that more consideration should be given to implementing Alternative Plan 5.

Response. - As was noted in the Alternatives section and as will be noted in the Conclusions to follow, the various plans each have their advantages. While floodplain regulation has the cited advantages and therefore would be the most acceptable plan to the larger, non-resident public, floodplain regulation is a local prerogative, and it does not appear to have broad-based local support.

Comment. - Under "irreversible and irretrievable commitments of resources" the EPA concurs with the statement: "There will also be a commitment to continued, and possibly increased, development in the floodplain. Thus, there will also be a commitment to perpetuate the basic problem."

Response. - Comment noted.

Comment. - Although we have environmental reservations on the project because we feel a better alternative exists, we commend you for the preparation of a detailed and objective Draft EIS.

Response. - Comment noted.

2. U.S. Department of Commerce. - No comments.

3. U.S. States Department of Interior. -

Comment. - No existing or proposed units of the National Park System would be adversely affected by the project.

Response. - Comment noted.

Comment. - The Department recommends that investigation of the Oliver Faribault Fur Post be initiated prior to construction and suggests that the findings be sent to the National Park Service and that contact be made with the Department of Anthropology, University of Minnesota.

Response. - The site would be investigated prior to construction and the finding sent as requested. As regards involvement by a professional archaeological team, the office of the State Archaeologist, Department of Anthropology, University of Minnesota, has been contacted, and we are encouraging their investigation of the site.

Comment. - The Department believes that the statement should provide more detailed information concerning methods which would be utilized to enhance aesthetic values, as well as a better description of those areas which would be impacted.

Response. - More detailed information has been incorporated in the project description and the section on Impacts upon Recreation and Aesthetics.

Comment. - The proposed action should have no significant long-term adverse effects on the geology of the project area or the mineral resource base of the immediate or surrounding areas.

Response. - Comment noted.

Comment. - The project should not have significant long-term adverse effects on either the surface-water or groundwater resources of the area.

Response. - Comment noted.

Comment. - From the standpoint of outdoor recreation in general, the statement is adequate.

Response. - Comment noted.

Comment. - The reference to possible landscaping on the levee should not be viewed as mitigation for wildlife habitat losses attributable to the project.

Response. - Reference has been deleted.

Comment. - With respect to the alternatives considered, the EIS does not mention compensatory action that would be required to offset anticipated losses to fish and wildlife resources. The USDI Bureau of Sport Fisheries and Wildlife in letters of 2 April and 1 June 1973 provided information on compensatory measures.

Response. - The Corps has held a coordination meeting with the Bureau in this regard, and that agency is reviewing their position on compensatory action. (The Bureau's letters of 2 April and 1 June 1973 are appended just behind the USDI letter of comment on the draft EIS.)

Comment. - The economic calculations regarding the various alternatives are incorrect since costs relative to compensatory requirements for wildlife are not included.

Response. - While it is true that costs relative to compensatory requirements are not included in the economic analyses for any of the alternatives, the economic rankings of the various alternatives would change only among plans having greatly differing impacts on fish and wildlife, such as floodplain regulation as compared with several of the structural plans.

Comment. - The EIS lacks the necessary data to fully evaluate the various alternatives from the wildlife resource standpoint. Alternative 10 has a favorable benefit-cost ratio and is desirable from a fish and wildlife viewpoint due to the waterfowl and furbearer potential of the small headwater reservoirs. Yet, there is little information given with respect to this alternative. The wildlife enhancement potential of floodplain evacuation, floodplain regulation, or small headwater reservoirs is also treated lightly or mentioned only in passing. As a result, relative total impacts of these alternatives cannot be judged from the meager data presented.

Response. - The "Alternatives" section of the EIS has been revised and includes a more comprehensive treatment of fish and wildlife resources.

Comment. - The EIS reveals a need for preservation of wetlands and open space areas within the watershed studied. However, in light of the projected intensive development in the two watersheds over the next few years, considerable need also exists for preserving fish and wildlife resources throughout the entire project area, including the uplands. No alternative presented includes such features. Continued

coordination with the Bureau of Sport Fisheries and Wildlife under the Fish and Wildlife Coordination Act is required to make certain that measures pertinent to fish and wildlife resource development and protection are considered in final project planning.

Response. - Concur.

4. USDA Soil Conservation Service. -

Comment. - The proposed action section does not discuss the types of erosion control practices that will be used during and following construction. What type of vegetative cover is going to be used on the disturbed areas?

Response. - A paragraph on erosion control has been added to page 3.

Comment. - The Carver Soil and Water Conservation District is actively working with farmers and groups to develop a good land treatment program. Controlling the erosion and reducing the sediment in the watershed would be beneficial to the proposed plan.

Response. - The land treatment would also be beneficial irrespective of the proposed plan.

Comment. - On page 6, the first two paragraphs are confusing. The maximum 12 hour rain appears larger than the 24 hour maximum rain.

Response. - The first paragraph has been rewritten to make clear that records for the major storm apply to Minneapolis and the 12-hour record applies to Chaska. Chaska is about 12 miles to the southwest of Minneapolis (corporate limit to corporate limit).

Comment. - On page 8, under the Salida-Hayden Soil Association. Recommended rewrite: Many ravines and deep broad gullies are present and the association as a whole is too steep and severely eroded to be used as cropland.

Response. - Has been rewritten.

Comment. - The vegetation and land use sections under environmental setting are not described in a manner to assess what effects erosion and sedimentation may have on the proposed plan. The draft fully describes what various ecosystems are composed of, but we do question whether this narrative completely describes the proposed project area. We suggest that various land uses within the watershed be discussed in the environmental setting.

Response. - Erosion and sedimentation are discussed in subsections 2 and 3 of the Environmental Impacts of the Proposed Project. Information on these factors is fragmentary. The section on land use is within the section on the overall environmental setting.

Comment. - Page 34, second paragraph. The existing policy of the Service is that we will not provide drainage assistance where the primary purpose is to bring new land into agricultural production.

Response. - The paragraph has been rewritten in light of present policy.

5. USDA Forest Service (Northeastern Area, State and Private Forestry). -

Comment. - We think that this is one of the best drafts in all respects that we have reviewed, and your staff deserve commendation. The variety and combinations of alternatives considered, the descriptions of the forest ecosystems, and the breadth of review invited are all outstanding. A fair and impartial comparison of benefits and adverse impacts is presented, and of the alternatives considered, we can take no exception to the one favored.

Response. - Comment noted.

Comment. - Among the alternatives considered, you did not include watershed management and land treatment.

Response. - The topography, vegetation and land use on the Chaska and East Creek watersheds are such that flows on the creeks have been retarded and evened out in the past, as noted in the section on the environmental setting without the project. The creek discharges due to heavy rains or snowmelt are therefore substantially lower than are often found on watersheds of that size.

As noted in the same section, the policies in the new urban developments on the watershed, notably the Jonathan unit, will preserve these discharge-retarding characteristics through a system of greenbelts and recreational reservoirs. These policies approximately cancel the normal increase in discharges upon urbanization. (Normally the discharges increase several-fold upon urbanization of a watershed). In a sense, then, watershed management has been incorporated.

A system of small, Soil Conservation Service-type reservoirs could be installed on the watershed. These could function in a manner

similar to the Jonathan aesthetic and recreational reservoirs which provide some flood-retarding benefits but do not provide 100-year flood protection. These measures have been discussed under plan 9 of the "Alternatives."

Other types of land treatment could include such measures as permanent vegetation in critical areas, small dams in gullies, or dikes around agricultural fields to hold water on the fields.

Most of these measures could be highly desirable in a land and water management program and would significantly aid in preventing erosion, sedimentation and degradation of water quality. They could reduce flood damages but not provide 100-year flood protection, and therein lie problems with implementation of the measures. Because 100-year flood protection would not be provided in Chaska, the city would have to keep floodplain regulation in force along the floodplains of the 2 creeks and the Minnesota River. (Under the proposed project floodplain regulation could be lifted from most of the area, allowing relatively unrestricted development or redevelopment.) These alternatives would then probably not be as acceptable to Chaska as the proposed plan. Such a program would have to be implemented in close cooperation with other agencies such as the Soil Conservation Service.

The matter of intermediate regional flood protection is the key issue. Although retention of water where it falls has been recognized as highly desirable by several levels of government and has been deemed the most acceptable approach in at least one large-scale program for flood damage reduction (Rockwell, M. L. 1973. Consensus: The First Step. Water Spectrum 5(1): 9-16), less than complete intermediate regional flood protection would likely be viewed by Chaska as inadequate to meet their desires.

In urban areas where a hazard to human life from flooding exists, intermediate regional flood protection is the widely accepted standard.

Comment. - Although you open your discussion of Alternatives with the very reasonable statement that "a comprehensive -- plan for managing the floodplains of a particular river basin or locality would logically include one, or a combination of the following nonstructural and structural measures," The 14 alternatives considered are then strictly segregated into two separate groups, structural and nonstructural. No combination of structural and nonstructural devices is considered. No "comprehensive" plan is considered. A comprehensive plan might include watershed management, land treatment, and one or more of the nonstructural measures described, and one or more of the structural measures described. We realize that a very large number of combinations is possible, but we think that at least one comprehensive alternative should be considered and included.

Response. - Although it was not explicitly stated, all of the structural plans would require floodplain regulation in the residual floodplain and temporary ponding areas. This would entail a combination of plans as would the program of regulation, flood insurance, and flood proofing to be mentioned in the Conclusions section to follow. Flood forecasting and warning are also an integral part of most of the possible plans and, along with flood insurance, are currently available in Chaska. We agree that a more comprehensive watershed program would be desirable, but such an effort would be constrained by time and local desires.

6. U.S. Department of Health, Education and Welfare. - No comments received.

7. U.S. Department of Housing and Urban Development. - No comments received.

8. U.S. Department of Transportation, Federal Highway Administration, Region Five. -

Comment. - We note on page 37 and elsewhere that reference is made to possible relocation of State Highway 41 and U.S. Highway 212. We assume that the effect of the proposed flood control project on any future highway relocation in the Chaska area will be commented upon by the Minnesota Department of Highways after their review of the draft statement, based upon the progress of their studies to date. In any event modification of existing structures and new structures over proposed channels would be necessary to maintain the existing road network.

Response. - The comments by the Minnesota Department of Highways are considered later in this section. Modifications of the road network in Chaska have been considered in the plans and costs for the project.

Comment. - We find that the draft EIS comprehensively covers the details of the project and its impact on the environment.

Response. - Comment noted.

9. U.S. Department of Transportation, U.S. Coast Guard. -

Comment. - The Coast Guard forwards the comment of the Federal Railroad Administration which is somewhat concerned that no mention is given to coordination with the railroads involved. While the Administration sees no objection to the plan, they suggest that a statement addressing coordination with the railroads be included in the final EIS.

Response. - If and when the Corps has a more firm plan and construction is closer to reality, direct contact will be made and the railroads will become more heavily involved.

Comment. - The Coast Guard notes that the Federal Highway Administration states that: "Even if the highways remain at their present locations, some existing highway drainage structures will apparently require modification."

Response. - This is recognized.

Comment. - The Highway Administration also requests that copies of the final EIS be provided to the Minnesota Division of the Highway Administration and to the Minnesota Department of Highways.

Response. - This will be done. (The other Highway Administration comments have been considered previously.)

Comment. - The Department of Transportation has no objection to the project.

Response. - Comment noted.

10. Office of Economic Opportunity. - No comments received.

11. National Weather Service. - No comments received.

12. Upper Mississippi River Conservation Committee. - No comments received.

13. Minnesota Department of Natural Resources. -

Comment. - Forestry practices in general are well discussed, especially with respect to erosion and sediment, wildlife cover and aesthetics. However, we suggest reference to be made to the utilization of fiber or the planting of fast-growing species for periodic short rotation harvests.

Response. - In view of the impending urbanization of the watersheds, the desirable aesthetic features of wooded greenbelts in an urbanized area, and the undeveloped market for unprocessed forest products near Chaska, we believe that forestry is perhaps best as a desirable secondary use of these wooded areas. We realize that several commercial timber firms in the East rely upon small, private forest holdings, but it seems that the holdings are generally larger, have perhaps a greater variety of commercially valuable trees, and are not

so near a rapidly expanding urban area. In our judgment short rotations of fast-growing species for wood fiber is more appropriate in areas more remote from urban areas and on soils less suited for traditional agriculture. However, we do believe that some form of selection cutting, particularly in areas soon to be developed and in accord with the plans for development, would yield a desirable product while maintaining, and perhaps enhancing, the amenities of wooded areas.

Comment. - Ravines and deep broad gullies should be kept under vegetative and tree cover. Steep pastured areas should be restricted against grazing and additional shrubs and trees planted to improve stand density. A reduction of forested area would have an adverse effect on the environment in this area which has suffered a drastic decrease in forested acreage during the past 30 years.

Response. - Concur, except that it may not be desirable to increase stand density unless the objective is commercial wood production.

Comment. - The DNR recommends that a floodway be assured on the opposite side of the Minnesota River by the purchase of such lands. Such a purchase would be compatible with the proposals for the Minnesota Valley Trail and the National Recreation Wildlife Areas, the latter advanced by the Burnsville Environmental Council. Although this area is presently designated as a floodway and floodway status will be adopted as part of local floodplain regulations, there are no absolute assurances that all of these lands will remain in this state.

Response. - Concur with your concern and objectives. However, the purchase of all lands associated with the flood control project is a local responsibility and the choice is theirs subject to mutual agreement. Because the project would not affect that floodway area, nor are the lands needed for project structures, the Corps cannot assure that the city would purchase those lands.

Comment. - The threat of floods has not inhibited construction in the floodplain since some 100 new homes have been built within the East Creek floodplain during the last few years. The city of Chaska is currently working with this department toward adoption of an appropriate floodplain ordinance to properly guide future construction of this nature.

Response. - The engineering data necessary to draft a floodplain ordinance for East Creek have only recently been available

as a result of this interim study. Thus, there has been no legal constraint on the construction in question. The prospects of having a flood control project in Chaska may have encouraged the construction as has the absence of recent flooding on the creek. It seems generally true that people become concerned about flooding only when flooding has recently occurred or is imminent. Concern may also be fostered by frequent discussion of the hazards of flooding.

Comment. - Flood control structures should have natural slopes and irregular lines so as to leave conditions as near to natural as practicable. Such development as straight grades, constant slopes or concrete flumes should be avoided.

Response. - Concur.

Comment. - Lands taken for any creek diversion should be held in public ownership. This would preclude the need for additional permission for any repair work or riprapping on private property.

Response. - In accordance with provision of the Flood Control Act of 1936 and section 4 of the Flood Control Act of 1944, local interests would have to:

(1) Provide without cost to the Federal Government all lands, easements, and rights-of-way necessary for construction of the project; and

(2) Prevent any encroachment on the existing East Creek and Chaska Creek channels, constructed works, floodways, and ponding areas that would interfere with the proper functioning of the project and, if ponding is impaired, provide promptly and without Federal cost substitute storage or equivalent pumping capacity.

Comment. - The DNR stresses the importance of maintaining a trail system in the area. The channel diversion corridor could also serve trail uses.

Response. - Local interests have indicated a desire and willingness to participate in constructing a trail system near Courthouse Lake incorporating part of the levee. They have also indicated interest in a trail system along Chaska and East Creeks. Further progress in local planning is needed before a detailed system could be identified.

Comment. - The statement appears to have omitted references to points of historical significance. Since we know of the existence of an old stagecoach trail in the area, we suggest the Minnesota Historical Society be contacted.

Response. - The Society provided a list of historically or archeologically significant sites near Chaska as noted in the section on History and Archeology. We will contact the Society regarding the stagecoach trail.

Comment. - It appears that this project will require a state permit to work in public waters. This would be available from the DNR.

Response. - We intend to contact your Department regarding a State permit. This would be done at a date closer to the time of construction.

Comment. - Looking at this project as a whole, we find no objection to it, provided that the aforementioned comments are implemented.

Response. - Comment noted.

14. Minnesota Department of Highways. -

Comment. - The Corps held several meetings with the Minnesota Highway Department on proposed alignments for T.H. 212 and T.H. 41 in the area of Chaska, and your proposal does not appear to be in serious conflict with highway needs. We request consideration of shifting the East Creek bypass channel as far to the west as possible to eliminate a possible horizontal sight distance problem at our proposed interchange between existing T.H. 212 and new located T.H. 41. We also refer to a possible realignment of existing T.H. 212 in the interchange area, and it might be well to keep outside this realignment area if possible. These matters can be reviewed when your detailed plans are being developed.

Response. - The channel alignment can be expected to change upon further planning and design. The alignment will be coordinated with interested parties. Your request for a shift of the East Creek channel to the west should be in accord with the concerns of the Environmental Protection Agency (see EPA comment-response number 8: "EPA wetlands policy...").

Comment. - We are presently preparing environmental statements for T.H. 169, T.H. 212 and T.H. 41, and the Minnesota River flood control is a consideration in the choice of alternative highway locations.

Response. - The flood control and highway projects are still years away from construction with the highway project quite possibly being built before the flood control works. In view of the lead time involved, close coordination of the engineering and environmental considerations could be easily accomplished.

15. Minnesota Pollution Control Agency. -

Comment. - The staff of the Minnesota Pollution Control Agency has reviewed and hereby concurs with the draft environmental impact statement for the project.

Response. - Comment noted.

16. Minnesota State Planning Agency. -

Comment. - This is to certify that the Minnesota State Planning Agency has, in accordance with the procedures established by OMB Circular A-95, reviewed the draft environmental statement. State agencies that might be interested or affected by the proposal have been notified. No comments were received from these agencies.

Response. - Those agencies with a particular interest in the project have responded directly to the Corps.

17. Minnesota State Park Commission. - No comments received.

18. Bell Museum of Natural History, University of Minnesota. - No comments received.

19. Fresh Water Biological Institute, University of Minnesota. - No comments received.

20. School of Forestry, University of Minnesota. - No comments received.

21. Minnesota Historical Society (response from State Archeologist). -

Comment. - We have examined potential archeological areas noted from the maps included in the draft EIS and find no surface evidence of any archeological remains.

Response. - Comment noted.

Comment. - The EIS is certainly very well done.

Response. - Comment noted.

Comment. - We would appreciate it if you would consult professional archeologists in the preparation of any future impact studies. I noted that ecological, the water resources, hydrological and other impact statements were all prepared by professionals in those fields for the Chaska report, but the historical site and archeological statement was based on information supplied by local residents. It

seems to me that archeological value should receive as much attention as other resources and environmental factors.

Response. - Concur with last sentence. In order to properly treat archeological considerations, we are attempting to involve your staff in all Corps projects and projects subject to the Corps' regulatory permits under section 10 of the River and Harbor Act of 1899.

22. Southern Minnesota River Basins Commission. - No comments received.

23. Lower Minnesota River Watershed District. - No comments received.

24. Metropolitan Council (Metropolitan Government for 7-county Twin Cities Area). - No comments received.

25. Metropolitan Sewer Board. - No comments received.

26. County Engineer, Carver County. - No comments received.

27. Carver County Agricultural Extension Agent. - No comments received.

28. Hennepin County Park Reserve District. - No comments received.

29. Mayor, City of Chaska. -

Comment. - The City of Chaska approves of the draft EIS dated 10 May 1973.

Response. - Comment noted.

Comment. - In a letter to the Corps dated 16 July 1973 (attached), the City took exception to the Bureau of Sport Fisheries and Wildlife position on compensatory action, feeling that the Bureau's comments were not applicable to this project. The City also pointed out that the Minnesota Department of Natural Resources had reviewed the project and had no objections to it from an environmental standpoint.

Response. - The Corps and Bureau have held a meeting on this matter, and the Bureau is reexamining their position.

30. Chaska City Manager. - No comments received.

31. Mayor, Village of Chanhassen. - No comments received.

32. Minnesota Environmental Defense Council, St. Cloud. - No comments received.

33. Minnesota Environmental Resources Defense Council, Minneapolis. - No comments received.

34. Environmental Library of Minnesota. - No comments received.

35. Jonathan Development Corporation, Chaska. - No comments received.

36. Sierra Club, North Star Chapter. -

Comment. - The chapter is opposed to the proposed project. We recognize that certain water resource problems exist and should be solved but not at the expense of downstream neighbors. While this is a relatively small project, the cumulative effect of small projects leads to larger floods in the future. (The Chapter then refers to the large flood on the main stem Mississippi River in the spring of 1973.) We believe that a moratorium on all drainage, channelization and floodplain use should be mandatory until a complete study has been made of all contributing factors to the 1973 flood on the Mississippi.

Response. - We appreciate your concern and your recognition of the cumulative effects of many small projects. While we therefore basically agree with your conclusions, the effects of this project would be so small that it would not affect flood stages in other areas.

37. Environmental Science Center, Golden Valley. - No comments received.

38. Environmental Information Center, Inc., New York, N.Y. - No comments received.

39. Center for Urban Encounter (CUE), St. Paul. - No comments received.

40. Clear Air-Clear Water Unlimited, South St. Paul. - No comments received.

41. Minnesota Environmental Education and Research Association, St. Paul. - No comments received.

42. Minnesota Environmental Control Citizens Association (MECCA), St. Paul. - No comments received.

43. Izaak Walton League of America, Minnesota Division, Minneapolis. - No comments received.

44. Northern Environmental Council, Duluth. - No comments received.

45. Environmental Concerns, Inc., Edina. - No comments received.

46. Minnesota League of Women Voters, St. Paul. - No comments received.

47. Soil Conservation Society of America, Minnesota Chapter, Willmar. - No comments received.

48. Minnesota Public Interest Research Group (MPIRG), Minneapolis. - No comments received.

49. Minnesota Conservation Federation, Hopkins. - No comments received.

50. National Audubon Society, Red Wing. - No comments received.

51. Minnesota Federation of Women's Clubs. - No comments received.

52. National Campers and Hikers Association, Minneapolis. - No comments received.

53. The Nature Center - Carver Park, Excelsior. - No comments received.

54. Minnesota Pheasants Unlimited, Minneapolis. - No comments received.

55. Ducks Unlimited, Minneapolis. - No comments received.

56. Federated Garden Club of America, Minnesota Chapter, St. Louis Park. - No comments received.

57. The Minneapolis Bird Club (Minneapolis Chapter, National Audubon Society). -

Comment. - We have reviewed the draft EIS and have no adverse comment.

Response. - Comment noted.

58. Minnesota Association of Conservation Education, Minneapolis. - No comments received.

59. Minnesota Futurists (World Future Society), St. Paul. -
No comments received.

60. Minnesota Lakeshore Property Owners Association, Minneapolis. -
No comments received.

61. Assumption Seminary, Bloomington. - No comments received.

62. Chaska Citizen's Advisory Committee.

Mr. Al Klingelhutz
Mr. Cy Ess
Mr. Randy Christianson
Ms. Luella Schmitt
Mr. Danny Klingelhutz
Mr. C. A. Lubansky
Mr. Ben Lind
Mr. Doug Bade
Mr. C. D. Gibson
Mr. Marvin Diedrick

No comments received.

63. Mr. George Wenzel, Chaska. - No comments received.

64. Chicago and North Western Transportation Company, St. Paul. -
No comments received.

65. Chicago, Milwaukee, St. Paul, and Pacific Railroad, Minneapolis. -
No comments received.

66. Dr. Daniel E. Willard, Institute for Environmental Studies,
University of Wisconsin, Madison. - No comments received.

67. Mr. Jonathan P. Ela, Sierra Club, Madison, Wisconsin. - No
comments received.

Comments on the revised draft statement were received from the following agencies:

U.S. Department of Interior
U.S. Department of Agriculture
U.S. Department of Transportation
U.S. Environmental Protection Agency
Minnesota Department of Natural Resources

The ensuing pages outline the Corps response to comments resulting from State and Departmental review. Copies of the letters can be found in Appendix B.

1. United States Department of the Interior. -

Comment. - With reference to page 28 (third paragraph) of the revised draft statement, according to a USGS study (Guetzkow and Carlson, 1973, Floodplain areas of the lower Minnesota River; USGS Water Resources Invest., Rept. 15-74) the flood of April 1965 reached a stage of 722.8 feet at the Corps of Engineers gage in Chaska, and the flood of 1969 reached a peak stage of 720.9 feet. The 1965 flood slightly exceeded the 1-percent flood.

It seems appropriate here to excerpt the following two paragraphs from the "History of Flooding" section of the above-referenced report:

"The pattern of development on floodplain areas has changed in recent years. Diking to protect existing industries and new industrial expansion across large areas of the floodplain have increased the upstream flood potential. The most severe encroachments are in the reach extending several miles upstream from Interstate Highway 35W."

"As part of this study, a detailed analysis was made of the peak discharge associated with the 1969 flood for floodplain conditions existing in 1969 and also for those conditions existing in the spring of 1972. This analysis indicates that added encroachment on the flood plain since 1969 would increase the elevation for a flood of the same magnitude by almost half a foot in the Savage area. Although the increase in elevation would diminish upstream, some of the effect would continue to Carver Rapids."

Response. - The elevations for the maximum stages for the 1965 and 1969 Minnesota River floods at Chaska have been revised as suggested. The effects of new flood plain development

on flood stages would be analyzed during post-authorization studies, and project designs would be modified to reflect these effects at that time. Recognizing the uncertain effects that past and future downstream floodplain encroachment may have on flood levels in Chaska, the freeboard for the project levees on the Minnesota River was set at 4 feet in contrast to the 3 feet of freeboard normally designed into urban levees on the lower Minnesota River.

Comment. - It is indicated in the first paragraph on page 70 that additional contacts are to be made with the Minnesota State Historical Society whose director, Mr. Russell W. Fridley, is the State Historic Preservation Officer. Specific comments received from the State Historic Preservation Officer should be incorporated into the final statement.

We note that while our comments on archaeological resources (contained in Ms. McGrath's letter of July 18, 1973, in Appendix A) have been acknowledged, no specific arrangements appear to have been made for an archaeological investigation of the Oliver Faribault fur post site. This site should be located and its significance determined prior to the commencement of any construction activities. If it is determined that excavation is necessary, the final statement should indicate arrangements that have been made to adequately mitigate the impact through salvage excavation.

Response. - Since preparation of the revised draft statement, the Corps has started to follow a new set of guidelines for protecting cultural properties. The guidelines require records searches, field survey and testing etc., and this work would be accomplished by qualified personnel when planning studies resume after project authorization. An objective of the cultural studies would be to determine if any sites discovered should be salvaged, avoided by project design changes, or whatever. The investigations, which would include the Faribault site, would be coordinated with the proper authorities, including Mr. Fridley.

The Historical Society did not respond to an invitation to comment on the draft environmental statement.

Comment. - The final statement should also reflect procedures to be followed in the event that previously unknown archaeological resources are encountered during project development.

Response. - While our plans and specifications for construction contracts provide for stoppage of work when it is in the interest of the government, e.g. if cultural resources are uncovered, the protection provided is often ineffective because, for example, the contractor usually feels that there are economic disadvantages to stopping the work. We intend to review our plans and specifications to solve problems such as this. While we have not yet done so, review and possible rewrite of specifications would certainly be accomplished prior to construction at Chaska.

Requiring the construction contractor to notify the the Contracting Officer in the event that cultural materials are uncovered has also been considered. It is felt that this approach would be generally ineffective because the contractor would probably only recognize the most conspicuous and identifiable artifacts, such as a skull in a cut bank. To solve this problem within constraints of funding and manpower, we are investigating possibilities such as some of the archaeological education programs at local universities. Under a cooperative program, a qualified student might be assigned (as part of his field study scholastic requirements) to be periodically present at construction sites. The student would receive credit at his school for the work, and the government would benefit from having a qualified observer on-site and charged with determining when the proper authorities must be contacted.

However, it should be noted that these contingency plans would be secondary protection for cultural properties. It is intended that the primary protection be an adequate program of preconstruction survey, intensive testing, salvage, deferral of certain parts of the construction, project redesign, or whatever is most appropriate in the specific case.

Comment. - Under item 21 on page 71 we assume that the University of Minnesota, Department of Anthropology should be inserted instead of the Minnesota Historical Society.

Response. - The Minnesota Historical Society was sent a copy of the draft environmental statement, but the Society did not comment on the document. The State Archaeologist apparently became involved in the review process through the State Clearing-house procedure established by OMB Circular A-95. Post-authorization studies would include coordination with those entities charged with the protection of cultural resources.

Comment. - The project design changes described in the feasibility report and the attendant revisions in the draft environmental impact statement do not significantly alter the previously proposed improvements and, therefore, do not increase the mineral resource involvement. We do not anticipate adverse impacts on mineral resources in Carver County, or in Chaska, Minnesota, attributable to the proposed project.

The impacts of the proposal on recreation, fish and wildlife resources appear to be adequately evaluated.

Response. - Comment noted.

Comment. - We agree that greenways are a desirable addition to this project; however, it should be noted that they probably will not have high value as wildlife habitat.

Response. - Concur; further studies would include assessment of their wildlife habitat potential and the possibilities for increasing the potential (or minimizing its decrease).

2. United States Department of Agriculture. -

Two specific comments were made on the feasibility report. No comments were directed at the revised draft environmental statement.

3. United States Department of Transportation. -

Comment. - The discussion of corridor location studies for 'Trunk Highways 169, 212 and 41' appearing on page 24 might be updated in the final by citing the fact that FHWA draft statements for location approvals on U. S. 212 and Minnesota Route 41 have developed and were transmitted to CEQ on September 27 and October 11, 1974, respectively. Another draft EIS is being developed for FHWA location approval on U. S. 169.

Response. - Comment has been incorporated into the text.

Comment. - The discussion of historic properties on pages 30 and 31 does not appear to fully show compliance with the procedures for identification of properties eligible for inclusion in the National Register of Historic Places per paragraph 800.4(a)(2) of the ACHP procedures. Consultation was with a local historian rather than with the appropriate State Historic Preservation Officer which is the Director of the Minnesota Historical Society. This apparent discrepancy is also reflected by the notation on page 71 which suggests that response from the State Archaeologist constitutes comments from the Minnesota Historical Society whereas these are two separate and distinct entities. We bring these to your attention not in criticism of the revised DEIS, but as technicalities which could possibly be improved in the Corps final EIS and thereby help protect them from future problems.

Response. - Concur with substance of comment. Post-authorization studies would include field study and proper coordination with others.

4. United States Environmental Protection Agency. -

Comment. - We have completed our review of the Revised Draft Environmental Impact Statement (EIS) for Flood Control at Chaska, Carver County, Minnesota as requested in your letter dated

October 23, 1974. We have classified our attached comments as Category ER-2. Specifically, this means that we have environmental reservations regarding the project, and we believe that additional information should be provided in the EIS to more fully assess the total project impact.

As you are aware, we have had considerable involvement in the proposed flood control project at Chaska through a site inspection with the district staff and our review of the Draft EIS on June 18, 1973. Our comments expressed the desirability of using a more environmentally compatible alternative such as flood plain regulation and requested additional information regarding spoil disposal and the project's impacts upon wetlands, water quality and land use. We believe the Revised Draft EIS inadequately addressed our comments on the Draft EIS, and we still have reservations with regard to the secondary effects of urbanized development in the upper watershed and project-induced floodplain and wetland encroachment upon water quality and flood levels.

Response. - The project was formulated using feasibility scope information available at that time. The conclusions that were reached are still felt to be valid for that level of the study. However, studies of the problems you have pointed out and a reevaluation of alternatives would be undertaken during post-authorization studies, the first phase of which is intended to determine if the authorized plan, or a modification thereof, would reflect current public desires and meet current standards for national economic efficiency, environmental quality, regional development, and social well-being.

Your suggestions as to problems needing further studies will have considerable value in guiding our investigations when project studies resume.

Comment. - Project Description. The existing and future intermediate regional flood plain (IRFP) at Chaska should be described in detail. While the EIS and Feasibility Report (FR) illustrate an IRFP area at Chaska with future runoff conditions, an exhibit should be included to show how project improvements will reduce this IRFP area. The separate and combined benefits of each of the proposed structural measures with respect to reducing the IRFP area should be

described in detail and portrayed with contours on a map overlay. A similar portrayal for alternative nonstructural and structural measures would also be desirable.

Response. - The suggested method of presentation would appear to be rather effective and would be considered during post-authorization studies.

Comment. - Wetlands represent a unique, irreplaceable water resource. It is our policy to give particular cognizance to any proposal that has the potential to damage wetlands, to recognize their value, and to preserve and protect them from damaging misuses. It is indicated that this project will cut across the west end of a 230-acre flood plain wetland and will adversely impact 30 acres of wetland that has already been partially drained by private interests. As described in the EIS, the 230 acres are confined to a "bench east of Chaska between Carver County Highway 17 and Bluff Creek on the west and east and between Highway 212 and the valley bluffs on the south and north." It is not clear whether this includes wetlands on both sides of the Minnesota River or only the north side. It was also stated that the Minnesota and St. Louis Railroad bisects the wetland from west to east and that the portion north of the railroad is a marsh with cattail, bulrush and smartweed while south of the railroad the wetland is a wet meadow. The value of the 230-acre tract of wetlands should be described in more detail and their location illustrated on a map exhibit. While some observations of the project's effects have been made on the remaining 200 acres of wetland, the EIS indicated that the degree and area of impact "cannot be adequately assessed" and "definitive judgements would require further study." According to the EIS, it appears that the wetlands are recharged by shallow aquifers having an eastward flow that may be subject to cut off by the bypass channel. Local surface and subsurface drainage inherent to the wetlands hydrologic cycle should be portrayed on a map overlay or with geological profiles.

The Shakopee Quadrangle indicates the 230-acre tract of wetlands using the boundaries given in the EIS to be composed of general independent wetland areas rather than being one large single tract. While the wetlands are a part of the same floodplain ecosystem, the natural and manmade features affecting each wetland area are unique and intrinsically responsible for their continued existence. Each major wetland sector should be described relative to these factors, i.e., local geology and land forms, drainage and general wildlife

resources. During our field inspections in June 1973 and July 1974, we observed several pond areas in the 30 to 40 acre wetland area south of the trailer park between the wet meadow zone and the floodplain forest. Since this wetland area will be impacted by the project, a detailed assessment of the waterfowl and fishery resources of these ponds and any remaining undrained and unfilled portions of this wetland tract should be included in the EIS. The relative ecological and social importance of this particular wetland area as compared to the other wetland sectors in the area - Nyssens Lake wetlands and the West Rice Lake wetlands west of Bluff Creek - should be established in the EIS. Additional information on how the bypass channel will affect and complete the drainage of the 30-acre wetland (page 33) and on the extent of private drainage already accomplished should be provided in the EIS. The long-term effects of this project upon the remaining wetlands in the area should be noted.

The new Corps of Engineers policy regarding the safeguard of wetlands as described in the April 3, 1974 Federal Register is highly desirable and consistent with our own views (May 2, 1973 Federal Register). Such policy could substantially discourage the unnecessary alteration and destruction of wetlands considered to be vital to the riverine flowage. Although this policy is directed primarily toward the evaluation of permit applications, we fully realize the inherent responsibilities to follow your policy and the guidance of other agencies in wetlands preservation.

In our August 29, 1974 comments (copy attached) on the Draft EIS for M.R. 41, we express environmental reservations regarding the crossing of Minnesota River in this area and the removal of flood plain wetland. We have also attached a copy of our December 12, 1974 comments on the Draft EIS for U.S. 212. The effects that both of these projects will have upon the subject flood control proposal should be carefully considered and addressed in the Final EIS. These highway projects will certainly affect watershed drainage and therefore, should be appraised in the project's design and benefit/cost computations.

Response. - The 230-acre wetland is entirely on the left bank of the Minnesota River and in the area of the East Creek flood bypass channel. This has been clarified by adding "respectively" to the sentence on the location of the 230-acre wetland. It should be noted that the wetland is on a bench, not in the Minnesota River floodplain. The wetland would receive attention during post-author-ization studies, such as the highway projects, and the effects of functionally or geographically related projects would be considered.

Comment. - The secondary effects of this project upon water quality and future flood levels have not been addressed. The usefulness of the data provided by the hydrograph model of the watershed and the responsiveness of the model to project-induced and future land use development in the watershed should be substantiated. The IS should indicate the level of urban development in the watershed that was considered for the 100 year intermediate regional flood. It should be recognized that as the watershed becomes increasingly urbanized and more impervious, higher rates and amounts of runoff will result. Of the total 15,860 acres in the composite watershed, approximately two-thirds are scheduled to be part of the planned community of Jonathan. The consequences of future urbanization such as the Jonathan model development and extensive highway interchange and frontage development in the watersheds should be analyzed sufficiently to determine appropriate runoff adjustment factors for computing storm flows and flood frequencies. Otherwise, project benefits and costs may be based on parameters that may not be realistic nor fit the more urbanized conditions in the future.

According to the FR, the East Creek flood bypass structure and channel were designed to pass the standard project flood of 8430 cfs at the proposed point of diversion. This will easily accommodate the intermediate regional flood (1% flood) flow of 4700 cfs at this point. However, even with the East Creek bypass structure, it is indicated that there are sufficient tributary flows downstream to cause bank overflows and local flooding from approximately 1000' upstream of the USH 212 bridge to an area south of the Beech Street bridge (B-19). While it was noted that anticipated flood damages from an intermediate regional flood for this reach would be minor, the severity of damages from floods greater than an intermediate regional flood, such as the standard project flood and the probable maximum flood, is not known. According to pages B-17, B-19 and Plate E-4 of the FR, flows varying from 1180 cfs at the USH 212 bridge to 1294 cfs at the flood control levee would occur on East Creek during an intermediate regional flood. While stream notation is not clear in Table C-12 of the FR, it appears that flood damage begins at 500 cfs for East Creek and 1000 cfs for Chaska Creek. Since flows are still expected to reach 1180 cfs at USH 212 during an intermediate regional flood even after project construction, we believe the extent of the anticipated flood damage (C-12) from flows greater than 500 cfs passing East Creek should be described in more detail. The internal drainage effects that intermediate regional flood, standard project flood and probable maximum flood flows will have upon Chaska's proposed land use scheme in the East Creek floodplain should be discussed in the EIS. Information on internal flow rates and/or external flood levels that would necessitate the closure of the gravity outlet at the proposed East Creek levee crossing should be included in the EIS.

Response. - Water quality implications of the project would be studied during post-authorization phases, and the assistance of the EPA in study design would be requested.

The effects of future urbanization on the hydrologic aspects of the proposed project are fully discussed in Appendix B of the feasibility report. Damages, benefits and costs reported in the EIS reflect these projected conditions. The area just upstream of Highway 212 along East Creek is a residual floodplain which is recognized and discussed in Appendix B of the feasibility report. As part of the local cooperation agreement the city of Chaska has agreed to implement floodplain regulations in accordance with State law where intermediate regional flood protection is not provided. This is one such area which would require regulation after project construction. Studies are currently underway to regulate the East and Chaska Creek floodplain areas. The Minnesota River floodplain area is currently regulated. Therefore new construction in the floodplain of Chaska should be minimal. During post-authorization studies a reformulation of the proposed project including interior drainage aspects and the degree of protection offered will be made to reflect changed conditions in the project area which have occurred since the feasibility investigation.

Comment. - An exhibit should be included in the Final EIS showing the alternative diversion routes for East Creek under Plan 6.

Response. - A plate showing the alternate routes was not prepared during the survey study (although others were investigated) and hence has not been included. This would be considered during post-authorization studies and in fact would be more appropriate to produce at that time since land-use along the potential routes will probably change and require changes in alignments.

Comment. - Was a route considered through the creek flowing east past the Assumption Seminary? Would this creek's natural floodway have sufficient capacity to contain the desired flows from East Creek without channelization or extensive structural works? If the undeveloped floodplain downstream could handle bank overflows, structural works for this route would only need to be constructed in the upstream portion of the creek; the Assumption Seminary could be protected by structural measures, if necessary.

Response. - The route was considered and is mentioned under alternate routes 1 and 2 in the last sentence under plan 6 in the ALTERNATIVES section of the text. Neither of these alternative routes were chosen due to higher costs, both environmental and monetary, associated with construction of a flood bypass along these alignments as composed with the selected alignment. Post-authorization studies would include a reexamination of these alternatives.

Comment. - Consideration should be given to using the electric power line right-of-way in part or total for the bypass structure to prevent unnecessary erosion and removal of the floodplain forest.

Response. - This will be considered.

Comment. - The Nonstructural Alternative Plan 2 regarding total flood plain evacuation should correspond to the IRFP areas shown on Plate 2. We agree that floodplain evacuation with zoning and regulation is a plan that would provide permanent protection from flood damages within the regulatory floodplain. While total evacuation of the IRFP may be impractical as a short-term goal, it may not be as a long-term goal. We believe further consideration should be given to partial evacuation of those floodplain areas most prone to flooding as a short-term goal and to total evacuation as a long-term goal. Such an alternative would ultimately eliminate the major portion of flood damages. As pointed out in the EIS and the FR, most growth is and will be occurring in the Jonathan Unit and other suburban areas above the bluff and as such would render the old section of Chaska in the floodplain less important. It was further indicated that little development is expected in the future within the leveed area of Chaska since these areas are already nearly fully developed.

Response. - As noted in the response to the first EPA comment, alternative conceptual plans would be reevaluated during the first phase of post-authorization studies. However, it should be noted that the present level of study is the one which selects the conceptual plan of flood damage reduction. The plan is therefore somewhat locked-in on the levee-bypass channel concept since substantial departures from the authorized plan require significantly more effort to implement. Later phases of study essentially constitute reevaluations and increased detail on the plan recommended for authorization, with the suite of alternatives thoroughly considered being progressively more narrow in scope.

Comment. - We note that the floodplain area immediately north of Courthouse Lake and along East Creek will be subject to residential development after construction of the new levee structure as shown by Chaska's future land use plan. Comparison of the IRFP contour (Plate No. 2 of the EIS) with existing and future land use areas (Plate No. C-1 and No. C-2 of the FR) also reveal other IRFP areas along East Creek that will be subject to residential, commercial and industrial development. Such development is not compatible with the floodplain system and should be discouraged. Executive Order 11296, August 10, 1966 requires Federal agencies to provide leadership in encouraging broad and unified effort to prevent uneconomic uses and development of the Nation's floodplains and, in particular to lessen the risk of flood losses. The responsibility imposed by this Executive Order and our mandated concern for water quality consequences of flood damage require us to take an active interest in floodplain encroachment. While this project will reduce flood damages to Chaska, it will not eliminate them. Therefore, the need for an effective floodplain management plan is apparent. With proper planning and implementation of regulatory controls, the alternative of floodplain management could be an effective solution to minimizing flood damages. This alternative would be more advantageous on the regional and State

scale because it is more environmentally, socially, and economically compatible than the proposed project. Consideration should also be given to developing alternatives that incorporate portions of some or all of the non-structural alternatives and, where absolutely necessary, portions of structural alternatives.

Response. - The East Creek flood bypass channel and development of the "former" floodplain below the diversion structure is consistent with floodplain management standards since intermediate regional flood protection would be provided. (The standard project flood would also be contained within the freeboard range.) The project has in effect redefined the floodplain for administrative purposes of floodplain management. It is recognized that large floods could inundate the East Creek area; however, the flood would have to be much larger than the regulatory flood (and therefore outside the scope of present floodplain management) and the infrequent nature of such events causes them to have relatively little effect on economic analyses. It is therefore correct that the project would reduce flood damages but not eliminate them. It is also true that floodplain management would be required in the residual floodplain and interior drainage ponding areas.

Comment. - In order to preclude the possibility of project-induced flood damage due to future development in the floodable area of the East Creek and Minnesota River floodplain, we request a firm commitment from local interests to flood regulate and compatibly zone flood prone areas in the IRFP. This commitment should be made a part of the local assurances to be provided before any construction can be initiated.

Response. - One of the project's requirements of local cooperation is that local sponsor "implement and administer floodplain regulations in accordance with State law where intermediate regional flood protection is not provided." By resolution dated 12 June 1973 the city of Chaska has expressed its willingness to provide the required local cooperation.

5. Minnesota Department of Natural Resources. -

Comment. - There is a problem in the treatment of Plan 4 and Plan 5 (see pp. 46-50). The Plan 4 discussion on the National Flood Insurance Program contains gross inadequacies and does not appear to reflect the provisions of PL 93-234, the Flood Disaster Protection of 1973, which was signed into law on December 31, 1973. Until such time as this section is rewritten to reflect present-day laws and provisions, it is unacceptable to us.

Also, we are not pleased with the treatment given to Flood-Plain Regulation in Plan 5. Although erroneous statements are fewer, this section is vague and does not satisfactorily deal with the subject.

We would recommend that both of these sections be rewritten. We would offer our services to help on either plan but please note that the Federal Insurance Administrator of the Department of Housing and Urban Development (HUD) is responsible for administering the Flood Disaster Protection Act of 1973 and thus, would be your best source of information for Plan 4.

Response. - It is not entirely clear where the inadequacies lie since the discussion of plans 4 and 5 is reasonably consistent with our present knowledge of the programs. However, at this time, we definitely would write certain portions of the report differently if we were to start the report over again. For example, there were few incentives to enroll in the flood insurance program at the time that the paragraph at the top of page 47 was written, whereas now we would note that flood insurance is required for Federal or federally-related financial assistance for any building located in areas identified by HUD as having special flood hazards. The report is somewhat dated, and therefore, it is vague as to plans 4 and 5. However, it is also somewhat unclear just how plans 4 and 5 would have been specifically applied in the case of Chaska. As discussed in the first EPA comments-response, it is felt that the most prudent course of action is to bring the whole report up to date during post-authorization studies.

Further information on flood insurance and floodplain regulation is contained in Appendix E, Feasibility Report for Flood Control, Minnesota River at Chaska, Minnesota, August, 1973, of which copies are available in Corps offices for review or at the cost of reproduction and of which copies have been distributed to other agencies.

LETTERS RECEIVED BY THE
DISTRICT ENGINEER ON THE
DRAFT ENVIRONMENTAL STATEMENT

APPENDIX A

AD-A120 210

CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT F/G 13/2
MINNESOTA RIVER AT CHASKA, MINNESOTA, FLOOD CONTROL. FINAL ENVI--ETC(U)
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UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
1 NORTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

June 18, 1973

Lt. Col. Rodney E. Cox, District Engineer
U. S. Army Engineer District, St. Paul
1210 U. S. Post Office and Customhouse
St. Paul, Minnesota 55101

Dear Colonel Cox:

In response to your letter of May 15, 1973, we have reviewed the Draft Environmental Impact Statement (EIS) for the proposed flood control project at Chaska, Minnesota. We have classified our comments as Category ER-2. Specifically, this means we have environmental reservations regarding the project, and we believe that more information should be provided in the EIS to fully assess the environmental impacts. This classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on Federal actions under Section 309 of the Clean Air Act. We offer the following comments for your consideration:

Description of the Proposed Action. According to the EIS, the project will result in the drainage of portions of a 200 acre wetland area. The Final EIS should discuss the value of these wetlands and the amount of wetlands that would be affected by lowering the water table.

Recent residential and commercial developments have been encroaching onto the floodplain of East Creek. High flows on East Creek could cause extensive damage to these developments. If the proposed structural flood control measures will meet the state standards, floodplain regulation will not be required by Minnesota law. The result could be even greater residential and commercial development in flood prone areas which could cause even greater losses when the design flood is exceeded. The EIS should discuss whether the proposed project will meet state standards, and discuss the feasibility of developing the proposed project if floodplain regulation was also adopted.

The disposal of unsuitable and excess excavated materials should be described in the EIS. If the 30 acres of drained wetlands will be used for a disposal site, the EIS should discuss the ultimate use of this site and the effects upon adjacent wetlands.

Lt. Col. Rodney E. Cox, Dist. Engr.
St. Paul, Minn.

Environmental Impacts of the Proposed Action. On page 48 of the Draft EIS under "Impacts of Surface Waters," it is stated that there may be some secondary impacts on the river if the water quality of the influent waters from the creeks is lowered. We believe this statement should be expanded to explain how the proposed project will effect the water quality of the influent waters.

According to the EIS, the East Creek diversion channel will not significantly lower the water table in 200 acres of the 230 acre marsh which it traverses. Since even slight changes in the water table could alter wetland characteristics, the EIS should estimate the extent the water table will be lowered, and describe the impact upon the wetland ecosystem. Also, secondary impacts, such as inducement of private drainage and land development should be discussed.

Adverse Environmental Effects. EPA wetlands policy is quite explicit in stating that wetland areas are of major ecological value and consequently require extraordinary protection from development. The construction of the East Creek diversion channel will have a deleterious effect on portions of a 200 acre wetland area and modification of project measures to minimize the degradation of the quality of this wetland should be seriously considered.

The EIS should discuss the secondary effects of the project on upstream wetland drainage. Since the degree of flooding at Chaska will be decreased, landowners upstream may be relieved of the necessity to decrease downstream flood flows. The result could be an increase in wetland drainage and its corresponding adverse effects.

The proposed levee would protect Courthouse Lake from flooding by the Minnesota River. However, the lake would be used as a ponding area for runoff from East Creek while the Minnesota River is at flood stage. Since it is expected that the East Creek drainage area will become fully urbanized, the quality of this urban runoff could have undesirable effects upon the water quality of Courthouse Lake. The effects of urban runoff upon the water quality of Courthouse Lake and its present use as a "put and take" trout fishery should be discussed.

Alternatives. Plan 5, the alternative on floodplain regulation appears to be a viable solution. It would be a more effective solution to the problem and it would be more environmentally compatible, and economically feasible. Based on the information pro-

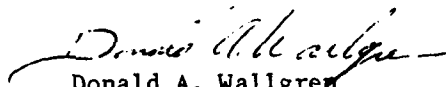
Lt. Col. Rodney E. Cox, Dist. Engr.
St. Paul, Minn.

vided in the Draft EIS and the Interim Survey Report, we believe that more consideration should be given to implementing Alternative Plan 5.

Irreversible and Irretrievable Commitments of Resources. We concur with the statement in this section which says, "There will also be a commitment to continue, and possibly increased, development in the floodplain. Thus, there will also be a commitment to perpetuate the basic problem."

Although we have environmental reservations on the project because we feel a better alternative exists, we commend you for the preparation of a detailed and objective Draft EIS. Please provide us with 4 copies of the Final EIS when it is submitted to the Council on Environmental Quality.

Sincerely yours,



Donald A. Wallgren
Chief, Federal Activities Branch



United States Department of the Interior

OFFICE OF THE SECRETARY

NORTH CENTRAL REGION

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

536 South Clark Street

Chicago, Illinois 60605

ER 73/720

July 18, 1973

Colonel Rodney E. Cox
District Engineer
U. S. Army Engineer District
St. Paul
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

This is in reply to your letter of May 11, 1973, requesting our comments on the Draft Environmental Impact Statement for the proposed flood control project on the Minnesota River at Chaska, Minnesota.

No existing or proposed units of the National Park System will be affected adversely by the project. With respect to historical and archeological impacts, we recommend that investigation of the Oliver Faribault Fur Post be initiated prior to development of the project area. A report of these findings should be submitted to the Director, National Park Service, Northeast Region, 143 South Third Street, Philadelphia, Pennsylvania 19106, so that the project may be properly evaluated for archeological values under Section 106 of the National Historic Preservation Act (P.L. 89-665). We suggest that this investigation be conducted by a professional archeological team such as the Department of Anthropology, University of Minnesota, Minneapolis, Minnesota 55455. In addition, we believe that the statement should provide more detailed information concerning methods which will be utilized to enhance aesthetic values, as well as including a better description of those areas which will be impacted.

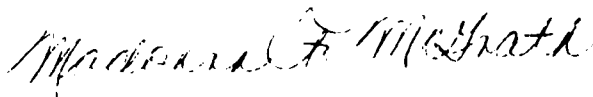
The proposed action should have no significant long-term adverse effects on the geology of the project area or on either the surface-water or ground-water resources of the area. The mineral resource base of the immediate or surrounding areas will not be affected by the project as now planned.

From the standpoint of outdoor recreation in general, the statement is adequate. Some improvement could be made in the final statement concerning fish and wildlife resources. For example, with respect to the alternatives considered, the impact statement makes no mention of compensatory action that would be required to offset anticipated losses to fish and wildlife resources. The reference to possible landscaping on the old levee near Courthouse Lake should not be viewed as mitigation for wildlife habitat losses attributable to the project--especially for those many acres of wetlands that will be lost because of the project with the present plan. As such, the economic calculations regarding the various alternatives are incorrect since costs relative to compensatory requirements for wildlife are not included. Bureau of Sport Fisheries and Wildlife letters of April 2 and June 1, 1973, provided information regarding such compensatory requirements for inclusion in your project report. We believe that fuller treatment of wildlife mitigation aspects should be included in the final statement.

The statement also lacks the necessary data needed to fully evaluate the various alternatives from the wildlife resource standpoint. Alternative 10 has a favorable benefit-cost ratio and is desirable from a fish and wildlife viewpoint, due to the waterfowl and furbearer potential of the small headwater reservoirs. Yet, there is little information given with respect to this alternative. The wildlife enhancement potential of floodplain evacuation, floodplain regulation, or small headwater reservoirs is also treated lightly or mentioned only in passing. As a result, relative total impacts of these alternatives cannot be judged from the meager data presented.

The statement reveals that there is need for preservation of wetlands and open space areas within the watersheds studied. However, in light of the projected intensive development in the two watersheds over the next few years, considerable need also exists for preserving fish and wildlife resources throughout the entire project area, including the uplands. No alternative presented by the planning agency includes such features. Continued coordination with the Bureau of Sport Fisheries and Wildlife (Fish and Wildlife Coordination Act) is required to make certain that measures pertinent to fish and wildlife resource development and protection are considered in final project planning.

Sincerely,



Madonna F. McGrath
Staff Assistant to the Secretary



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

IN REPLY REFER TO:

Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

April 2, 1973

Col. Rodney E. Cox
District Engineer
U. S. Army Engineer District
St. Paul
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Col. Cox:

This letter concerns the proposed flood control project for the East Creek and Chaska Creek watersheds including the city of Chaska, Minnesota which was discussed in your letter of January 9, 1973 (File NCSED-PB). We acknowledge too, the receipt of (1) a map of the watersheds, (2) aerial photo of Chaska showing in blue the potential flooding areas, (3) a copy of the Phase I report, and (4) a copy of the environmental working paper.

Our preliminary views on the various alternatives being considered for alleviation of the flooding potential at Chaska are given as requested by Mr. Borash at the inter-agency meeting of March 9. These alternatives are as follows: Plan 1, flood forecast warning; Plan 2, floodplain evacuation; Plan 3, flood proofing and evacuation; Plan 4, flood insurance; Plan 5, floodplain regulation; Plan 6, creek diversion; Plan 7, upgrade levees; Plan 8, divert creeks and upgrade levees; Plan 9, four headwater reservoirs; Plan 10, four reservoirs and divert creeks; Plan 11, one reservoir each creek; Plan 12, one reservoir each creek plus levees; Plan 13, channelize creeks; and Plan 14, channelize creeks plus levees.

We recognize that overbank flooding of the Minnesota River does create problems for the city of Chaska. Also, the planned development for the city of Jonathan in the headwaters of the two creeks may increase flooding potential in the downstream areas. The present levee is blocking flows in the creeks. By viewing the aerial map of Chaska it becomes apparent that a larger portion of the city lies in an area of double jeopardy--flooding from the Minnesota River as well as the creeks as a result of damaging effects of the levees.

Much of the present problem seems to be a result of reactionary measures taken to flooding in the past. When the original levee was constructed in about 1952, simply aligning it back a block or two would have prevented much of the flood damages and uncertainty which has occurred since that time, i.e., floods of 1965 and 1969. In the same sense, the damaging potential of the present levee is creating most of the fear of flash flooding on the creeks. The only long-range solution to the problem appears to be the evacuation of the potential flood area (floodplain) within the city, especially in the area of double jeopardy. The existing levee could be leveled toward the city and the area used for activities more compatible with floodplain use such as public parks, playgrounds and environmental corridors. Associated recreation benefits may tip the benefit-cost scale to the positive side. Under such a plan, very little compensatory action, if any, would be required to offset fish and wildlife resource losses.

From the environmental standpoint, Plan 4 (floodplain insurance) would be the next best alternative to evacuation if a phased evacuation is included. Such a plan would be relatively inexpensive and similar to Plan 3. Again, closer examination of potential recreational benefits on areas released by the project likely would assist in developing an economically feasible project. Possible environmental corridors in the affected areas would mesh well within the city environmental corridor plans and provide areas for some of the projected recreational needs along the Minnesota River.

In our judgment Plans 1, 5, 6, 7, 9, 11, and 13 would not provide adequate flood protection; we will not comment on these alternatives as there are other plans that provide more adequate protection.

We would be inclined to oppose channelization (Plan 14) since there apparently are other feasible alternatives. Plans 8, 10, and 12 would meet the stated "protection" objectives but all alternatives will require compensatory action to negate fish and wildlife habitat losses.

In each plan, the area outlined in blue on the aerial map will be removed from the floodplain. The project, therefore, will allow (and encourage) unlimited development in these areas. Fish and wildlife habitat losses must be assessed to the project and compensatory measures would be required for these areas.


Proposed diversion canals for East Chaska Creek will provide a potential drainage route for the marsh area north of the present St. John's Cemetery and we would consider at least half of the potential loss attributable to the project. If already existing habitat is purchased to

- 3 -

compensate for this loss, possibly five to ten acres of similar or better replacement habitat would be required for each acre lost. Usually, the land is turned over to the State for management with an additional provision made to cover this cost. Also, until effective pollution control is accomplished, diversion of the creeks would only worsen an existing poor water quality problem.

Although the above views are of a preliminary nature, we conclude that our first choice, from the long-term environmental standpoint, would be floodplain evacuation and our second choice would be flood insurance or flood proofing with a phased evacuation of the floodplain. Small headwater reservoirs appear worthy of further consideration if some permanent water can be maintained.

Sincerely,

A handwritten signature in dark ink, appearing to read "Travis S. Roberts". The signature is written in a cursive, slightly slanted style.

TRAVIS S. ROBERTS
Regional Director

cc: Minnesota Department of Natural Resources



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

Federal Building, Fort Snelling

Twin Cities, Minnesota 55111

June 1, 1973

IN REPLY REFER TO:

28

Col. Rodney E. Cox
District Engineer
U. S. Army Engineer District
St. Paul
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Col. Cox:

This letter is in response to the May 15, 1973, request (NCSFD-PE) for our comments on the draft Interim Survey Report for flood control on the Minnesota River at Chaska, Minnesota. Our review of the accompanying draft environmental statement will be made at a later date through proper channels.

We note from your letter that enhancement of fish and wildlife resources are needs to be considered by the project. We were unable, however, to find any evidence in the Interim Report that any such plans are included in the proposed work of improvement. In fact, it appears that there will be considerable loss and degradation of existing fish and wildlife habitat as a result of the project. Compensatory action will be required. One cannot enhance the resource situation without first accounting for anticipated losses.

Direct habitat losses attributable to the project will be 20 acres of cleared upland, 2.5 acres of wooded upland, 45 acres of wetlands, and 103 acres of mixed wetlands and woodlands. In addition, a system will be supplied (through the East Creek diversion canal) for drainage of another 230 acres of wetlands. It also has been our observation that flood protection in the lower portions of a watershed tend to release the moral obligation on those living in the watershed headwaters against draining their marshes. Therefore, such protective works tend to indirectly accelerate drainage of marshlands in the headwaters of the watersheds. In this case, up to 1,700 acres of marsh could be adversely affected as an indirect result of the project.

In our letter of April 2, 1973, we concluded that alternatives such as floodplain evacuation or flood insurance would be the better alternative from the standpoint of fish and wildlife resources. Another possible alternative for consideration would be the construction of a series of small headwater reservoirs. Our letter also outlined general measures which would be required to compensate for fish and wildlife habitat losses due to the various alternatives. Based on the outline we presented, a minimum of 2,400 acres of mixed bottomland (woodlands and wetlands such as that found along the Minnesota River floodplain) will be required to compensate for fish and wildlife habitat losses directly attributable to the project, as it is now planned.

If there are further questions, or there are any changes in project planning, please contact us.

Sincerely,

DAVID S. ROBERTS
Regional Director

cc: Minnesota Department of Natural Resources



United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

IN REPLY REFER TO:

ES

Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

October 31, 1973

Col. Rodney E. Cox
District Engineer
U. S. Army Engineer District
St. Paul
1210 U. S. Post Office & Custom House
St. Paul, Minnesota 55101

Dear Col. Cox:

This letter responds to your request of October 19, 1973, concerning effects on fish and wildlife of the proposed flood control project at Chaska, Minnesota.

The Bureau of Sport Fisheries and Wildlife does not oppose the general concept of the project. We support the acquisition of the greenbelts and required Minnesota River floodplain regulations shown in green on the project maps. However, the following project specifics need to be developed or answered:

1. The exact acreage of greenbelt and parkland to be acquired by the city of Chaska.
2. The width of the greenbelt along either side of Chaska and East Creeks.
3. The width of easement devoted to greenbelt and wildlife travel lanes on either side of the Chaska Creek diversion.

Do not hesitate to contact us for any assistance needed regarding development of greenbelts and related wildlife mitigation aspects of the project.

Sincerely,

Jack E. Hemphill
Regional Director

cc: Director, Minnesota Department
of Natural Resources, St. Paul

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

316 North Robert Street, St. Paul, Minnesota 55101

June 15, 1973

Colonel Rodney E. Cox, District Engineer
St. Paul District Corps of Engineers
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

The draft environmental impact statement for Flood Control at Chaska, Minnesota in Carver County, dated May 15, 1973, was referred to our Service for review and comment.

The proposed action section does not discuss the types of erosion control practices that will be used during and following construction. What type of vegetative cover is going to be used on the disturbed areas?

The Carver Soil and Water Conservation District is actively working with farmers and groups to develop a good land treatment program. The district will work closely, reviewing plans for urban uses in concerned watersheds.

Controlling the erosion and reducing the sediment in the watershed would be beneficial to the proposed plan.

On page six, the first two paragraphs are confusing. The maximum 12 hour rain appears larger than the 24 hour maximum rain.

On page eight, under the Salida-Hayden soil association. Recommend rewrite: Many ravines and deep broad gullies are present and the association as a whole is too steep and severely eroded to be used as cropland.

On page nine, under the Hayden-Lester-Peat soil association. Recommend rewrite: While the association is intensively farmed, many small areas are too steep to be used for crops and should be kept in permanent vegetation.



Colonel Rodney E. Cox

2

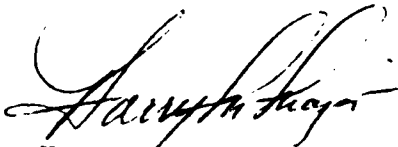
On page ten, first sentence. Recommend rewrite: Both soil associations occurring above the bluffs require drainage for optimum use as cropland.

The vegetation and land use sections under environmental setting are not described in a manner to assess what upstream effects that erosion and sedimentation may have on the proposed plan. The draft fully describes what various ecosystems are composed of, but we do question whether this narrative completely describes the proposed project area. We suggest that various land uses within the watershed be discussed in the environmental setting.

On page 34, second paragraph - the existing policy of the Service is that we will not provide drainage assistance where the primary purpose is to bring new land into agricultural production.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

A handwritten signature in cursive script, appearing to read "Harry M. Major".

Harry M. Major
State Conservationist

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA 19082
TELEPHONE (215) 382-5800

May 31, 1973

1940



Colonel Rodney E. Cox,
District Engineer, St. Paul District
Corps of Engineers
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Refer to: NCSED-E

Dear Colonel Cox:

Reference is made to your circular of May 11, addressed to our Eastern Region office, transmitting a copy of the Draft Environmental Impact Statement for Flood Control at Chaska, Minnesota.

We think that this is one of the best drafts in all respects that we have reviewed, and your staff deserve commendation. The variety and combinations of alternatives considered, the descriptions of the forest ecosystems, and the breadth of review invited are all outstanding. A fair and impartial comparison of benefits and adverse impacts is presented, and of the alternatives considered, we can take no exception to the one favored.

We have two major criticisms:

1. among the alternatives considered, you did not include watershed management and land treatment;

2. although you open your discussion of Alternatives with the very reasonable statement that "a comprehensive -- plan for managing the floodplains of a particular river basin or locality would logically include one, or a combination of the following nonstructural and structural measures," the 14 alternatives considered are then strictly segregated into two separate groups, structural and nonstructural. No combination of structural and nonstructural devices is considered. No "comprehensive" plan is considered. A comprehensive plan might include watershed management, land treatment, and one or more of the nonstructural measures described, and one or more of the structural measures described. We realize that a very large number of combinations is possible, but we think that at least one comprehensive alternative should be considered and included.

We appreciate the opportunity to review and comment upon this very fine draft.

Sincerely,

for William E. Murray
ROBERT D. RAISCH
Director



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5

Suite 490, Metro Square Bldg.
St. Paul, Minnesota 55101

May 31, 1972

IN REPLY REFER TO:

Colonel Rodney F. Cox
District Engineer
Corps of Engineers
St. Paul District
1211 U. S. Post Office & Custom House
St. Paul, Minnesota

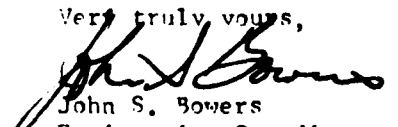
Dear Sir:

The Draft Environmental Impact Statement, Flood Control at Chaska, Minnesota, has been reviewed by this office.

We note on page 37 and elsewhere that reference is made to possible relocation of State Highway 41 and U. S. Highway 212. We assume that the affect of the proposed flood control project on any future highway relocation in the Chaska area will be commented upon by the Minnesota Department of Highways after their review of the draft statement, based upon the progress of their studies to date. In any event modification of existing structures and new structures over proposed channels would be necessary to maintain the existing road network.

The draft statement, we find comprehensively covers the details of the project and its impact on the environment.

Very truly yours,


John S. Bowers
Engineering Coordinator
For W. W. Fryhofer
Division Engineer

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**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

MAILING ADDRESS
U.S. COAST GUARD (G-WS/83)
400 SEVENTH STREET SW
WASHINGTON, D.C. 20580
PHONE 202 426-2262

1 August 1973

Colonel Rodney E. Cox
Corps of Engineers
St. Paul District
1210 Post Office Bldg. & Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

This is in response to your letter of 15 May 1973 addressed to the Federal Highway Administrator, St. Paul, Minnesota, concerning the draft environmental impact statement for the Proposed Flood Control Project, Chaska, Minnesota.

The Federal Railroad Administration commented as follows:

"The Federal Railroad Administration is somewhat concerned that no mention is given to coordination with the involved railroads. While we see no objection to the plan, it is suggested that a statement addressing coordination with the involved railroads be included with the final statement."

The Federal Highway Administration had the following comments to offer:

"The draft environmental impact statement makes reference to possible relocations of State Highway 41, U. S. 169 and U. S. 212. It also notes coordination has been established with the Minnesota Department of Highways. Such coordination is very appropriate. Even if the highways remain at their present locations, some existing highway drainage structures will apparently require modification.

"It is recommended that the Corps be requested to provide informational copies of the resultant final environmental impact statement to our Minnesota Division as well as the Minnesota Department of Highways."

The Department of Transportation has no further comments to offer nor do we have any objection to the project. However, it is requested that the concerns of the Federal Railroad Administration and Federal Highway Administration be addressed in the final environmental impact statement.

The opportunity to review this draft statement is appreciated.

Sincerely,


R. I. Price, Captain, USCG
Deputy Chief, Office of Marine Environment & Systems
By direction of the Commandant



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

July 24, 1973

Colonel Rodney E. Cox
District Engineer
Department of the Army
St. Paul District
Corps of Engineers
1210 U. S. Post Office and Customs House
St. Paul, Minnesota 55101

Dear Colonel Cox:

The Minnesota Department of Natural Resources has reviewed the "Draft Environmental Impact Statement, Flood Control at Chaska, Minnesota, Minnesota River" and submits the following comments regarding the document and its potential implications.

Forestry practices in general are well discussed, especially with respect to erosion and sediment, wildlife cover and aesthetics. However, we would suggest reference be made to the utilization of fiber or the planting of fast-growing species for periodic short rotation harvests.

Ravine and deep broad gullies should be kept under vegetative and tree cover. Steep pastured areas should be restricted against grazing and additional shrubs and trees planted to improve stand density. A reduction of forested area would have an adverse effect on the environment, especially in this area, which has suffered a drastic decrease in forested acreage during the past 30 years.

The Department of Natural Resources recommends that a floodway be assured on the opposite side of the Minnesota River by the purchase of such lands. Such a purchase would be compatible with the proposals for the Minnesota Valley Trail and the National Recreation Wildlife Areas, the latter advanced by the Burnsville Environmental Council. Although this area is presently designated as a floodway and will be adopted as part of local flood plain regulations, there are no absolute assurances that all of these lands will remain in this state. It seems that the threat of floods has not inhibited construction within the flood plain. Some 100 new homes have been built within the East Creek flood plain in the last few years. The City of Chaska is currently working with this department toward adoption of an appropriate flood plain ordinance to properly guide future construction of this nature.

Page 2
Colonel Cox
July 24, 1973

All development, whether dikes or new channels, should be produced with natural slopes, irregular lines and generally leaving conditions as near to natural as practicable. Such development as straight grades, constant slopes or concrete flumes should be avoided.

Lands taken for any creek diversion should be held in public ownership. This would preclude the need for additional permission for any repair work or rip-rapping on private property.

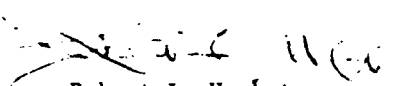
The Department stresses the importance of maintaining a trail system in the area, because of its importance regionally and state-wide as well as locally. The aforementioned channel diversion corridor could also serve trail uses.

The statement appears to have omitted references to points of historical significance. Since we have knowledge of existence of an old stage-coach trail in the area we suggest the Minnesota Historical Society be contacted.

It appears that this project will require a state permit to work in public waters. This would be available from the Department.

Looking at this project as a whole, we find no objection with it, provided that the aforementioned comments are implemented.

Sincerely,


Robert L. Herbst
Commissioner

RLH/tgh

cc: Archie D. Chelseth
Division Directors
PERT Members



STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
ST. PAUL, MINN. 55155

June 6, 1973

Colonel Rodney E. Cox, District Engineer
Corps of Engineers
Department of the Army
St. Paul District Corps of Engineers
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

In reply refer to: 330
S.P. 8805-01 (T.H. 41, 169 & 212)
Draft Environmental Impact Statement
Flood Control at Chaska, Minnesota
Minnesota River

Dear Colonel Cox:

We appreciate the opportunity to review the Draft Environmental Statement.

Several meetings were held with the Minnesota Highway Department on proposed alignments for T.H. 212 and T.H. 41 in the area of Chaska, and your proposal does not appear to be in serious conflict with highway needs. If you will refer to our letter of June 1, 1973 commenting on your draft report, you will note that we requested consideration of shifting the East Creek diversion channel as far westerly as possible to eliminate a possible horizontal sight distance problem at our proposed interchange between existing T.H. 212 and newly located T.H. 41 (Item 1b). We also refer to a possible realignment of existing T.H. 212 in the interchange area and it might be well to keep outside this realignment area if possible. These matters can be reviewed when your detailed plans are being developed.

We are presently preparing environmental statements for T.H. 169, T.H. 212 and T.H. 41 and the Minnesota River flood control is a consideration in the choice of alternative highway locations.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ray Lappegaard".

Ray Lappegaard
Commissioner

MINNESOTA POLLUTION CONTROL AGENCY

717 Delaware Street S.E./ Minneapolis, Minnesota 55440

(612) 296-5502

June 20, 1973

Mr. Rodney E. Cox
Colonel, Corps of Engineers
District Engineer
Department of the Army
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

Re: Draft environmental impact
statement for Flood Control
Project at Chaska, Minnesota
on the Minnesota River
MPCA #198

Dear Mr. Cox:

The staff of the Minnesota Pollution Control Agency has reviewed and hereby concurs with the draft environmental impact statement for the above project.

We appreciate the opportunity to review and comment on projects of this nature.

Yours very truly,

Lyle H. Smith
Chief Pollution Control Engineer

cc: Mr. Tom Herron, Clearinghouse, State Planning Agency

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STATE OF MINNEOTA

STATE PLANNING AGENCY
802 CAPITOL SQUARE BUILDING
550 CEDAR STREET
ST. PAUL, 55101

June 25, 1973

Mr. Rodney E. Cox
Colonel, Corps of Engineer
District Engineer
Dept. of the Army
1210 U.S. Post Office & Custom House
St. Paul, Minnesota 55101

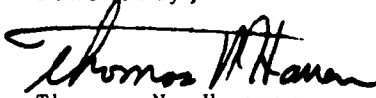
RE: Draft Environmental Statement for Flood Control Project
at Chaska, Minnesota - Minnesota River.

Dear Colonel Cox:

This is to certify that the Minnesota State Planning Agency has in accordance with the procedures established by OMB Circular A-95, reviewed the above mentioned draft environmental statement. State agencies that might be interested or affected by the proposal have been notified. *No comments* were received from these agencies.

This letter represents the final action by the State Planning Agency in its function as State Clearinghouse for the review of draft environmental statements.

Sincerely,


Thomas N. Harren
State Clearinghouse



UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Anthropology
215 Ford Hall
Minneapolis, Minnesota 55455

June 4, 1973

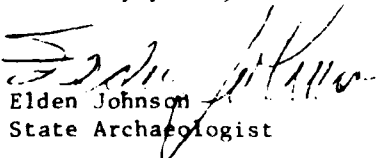
Colonel Rodney E. Cox
District Engineer
Department of the Army
St. Paul District, Corps of Engineers
1210 U.S. Post Office and Custom House
St. Paul, Minnesota 55101

Dear Colonel Cox:

Thank you for copies of the preliminary reports on the proposed flood control project at Chaska, Minnesota. We have examined potential archaeological areas noted from the maps included in those reports and find no surface evidence of any archaeological remains.

I should comment that the environmental impact statement is certainly very well done but we would appreciate it if you would consult professional archaeologists in the preparation of any future impact studies. I noted that ecological, the water resources, hydrological and other impact statements were all prepared by professionals in those fields for the Chaska report but the historic site and archaeological statement was based on information supplied by local residents. It seems to me that archaeological value should receive as much attention as other resources and environmental factors.

Sincerely yours,


Elden Johnson
State Archaeologist

EJ:nh

cc: Russell Fridley



Chaska

July 1, 1973

Colonel Rodney E. Cox
District Engineer
U. S. Army Corp of Engineers
St. Paul District
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Re: Proposed Chaska Creek Diversion Project.
Reply to Comments of U. S. Department of Interior
Bureau of Sport Fisheries and Wildlife

Dear Colonel Cox;

On behalf of the City of Chaska we wish to reply to the letter dated June 1, 1973 from Mr. Travis S. Roberts, Regional Director, of the United States Department of Interior, Bureau of Sports, Fisheries and Wildlife. Mr. Robert's letter claims that the proposed Creek Diversion Project in Chaska will adversely affect 2,400 acres of fish and wildlife habitat. Mr. Roberts therefore, recommends that the city should acquire a minimum of 2,400 acres of mixed bottom land to compensate for the so-called losses of fish and wildlife habitat directly attributable to the project.

We wish to go on record stating that the City of Chaska cannot and will not provide 2,400 acres of mixed bottom land for the following reasons. First, the acquisition of lands and right-of-way is a local financial responsibility. The City of Chaska cannot afford to acquire 2,400 acres of land in addition to what is now being acquired for open space and park purposes. Second, the proposed project directly affects no more than 40 acres of land for construction purposes as we understand it. We fail to see how this project involving 40 acres of land directly by providing two diversion channels in the southerly part of our community will adversely affect 2,400 acres of any kind of land. Third, we would like to point out that much of the land upstream from the diversion project is owned by the Jonathan Development Corporation which has a twenty year contract with the Department of Housing and Urban Development to develop a new town on this property. The Development Company is committed to plans approved by H. U. D. which will require approximately 30% of all of their land to remain in open space and natural conditions. The remaining 70% of their land will be developed over a twenty year period under the contract with H. U. D. Consequently the storm run-off in this area will continue to grow in magnitude, and areas would be drained

because of the urban development of the land. The proposed project in no way encourages the development or drainage of this land. Rather it is a project to protect the southern part of the community from a rapid run-off due to development of the land which was planned long before this project was initiated.

Fourth, we would like to point out that the City of Chaska is purchasing 100 acres of land for open space and park use. Part of these 100 acres is to be along the proposed diversion projects. We are purchasing this property with the aid of a \$50,000.00 grant from the Department of Housing and Urban Development and a \$100,000.00 grant from the State of Minnesota. In addition the citizens of Chaska have approved a bond referendum in the amount of \$250,000.00 to provide the local share of the park acquisition costs. We feel that with the acquisition of the city property in the south end and the commitment of the Jonathan Development Corporation to keep 30% of it's land open and under natural conditions in the northern part of the community, that we are more than providing reasonable requirements for fish and wildlife habitat.

We would also like to point out that the Minnesota Department of Natural Resources has also reviewed the project and has no objections to the project from an environmental stand point.

Based on the above stated reasons we feel the requirement to purchase an additional 2,400 acres of mixed bottom land and the objections listed by Mr. Roberts in his letter are without foundation. We feel the objections and recommendations listed by the Bureau of Sport Fisheries and Wildlife are not applicable to our project.

Respectfully yours,

Edgar F. Ziegler, D. D. S.
Mayor

cc: Congressman Ancher Nelson



Chaska

September 17, 1973

Colonel Rodney E. Cox
District Engineer
U. S. Army Corps of Engineers
St. Paul District
1210 U. S. Post Office and Custom House
St. Paul, Minnesota 55101

Re: Proposed Chaska Creek Diversion Project.
Comments on the Environmental Impact Statement Draft.

Dear Colonel Cox;

This letter is to advise the Corps of Engineers that the City of Chaska approves of the Environmental Impact Statement draft dated May 10, 1973, on the proposed flood control work in Chaska.

In a letter to you dated July 16, 1973, the City took exception to comments made by Mr. Travis S. Roberts, Regional Director, of the United States Department of Interior, Bureau of Sports, Fisheries and Wildlife. In that letter, we pointed out that Mr. Roberts' comments on the project and Environmental Impact Statement, we felt, were not applicable to this project. We also pointed out that the Minnesota Department of Natural Resources had reviewed the project and had no objections to it from an environmental stand point.

If you have any questions concerning the city's position, please call.

Respectfully yours,

Edgar F. Ziegler, D. D. S.
Mayor



SIERRA CLUB

North Star Chapter



June 7, 1973

Mr. Rodney E. Cox
U.S. Army Corps of Engineers
1210 U.S. Post Office
St. Paul, Minnesota 55101

Dear Mr. Cox:

RE: Proposed Flood Control Plan at
Chaska, Minnesota

The North Star Chapter of the Sierra Club is opposed to the projected Flood Control Plan at Chaska, Minnesota. We recognize the fact that certain water resource problems exist and should be solved but not at the expense of downstream neighbors.

While this is a relatively small project (0.9 and 1.2 mile diversion channels, 420 acres removed from the flood plain), it is the cumulative projects of this type that contributed to the record-breaking flood of this year.

The miles of drainage ditches, the channelization and straightening of rivers have all contributed to a rapid run-off of the rivers. The levees constructed by the Corps contained the water, but in so doing the tributaries were forced to back up against less sturdy levees and finally topped with severe property losses.

Almost 13,000,000 acres were flooded; 45 barge days have been lost this season; flood damage has been set at \$193 million dollars; vast changes were required in spring planting. If these figures were prorated over the on-going Corps projects, the cost-benefit ratio would show a huge deficit.

Many of the huge flood control and drainage projects now under construction throughout the Mississippi River Watershed will be contributing to high water for years to come.

We believe that a moratorium on all drainage, channelization and flood plain use be mandatory until a complete study has been made on all contributing factors to the great flood of 1973.

Sincerely,

Alfred E. Pease

MINNEAPOLIS

BIRD CLUB

May 25, 1973

District Engineer; St. Paul District
Corps of Engineers
1210 U.S. Post Office and Customs House
St. Paul, Minnesota 55101

Gentlemen:

We have reviewed the draft Environmental Impact Statement on the proposed flood control facilities at Chaska, Minnesota and have no adverse comment.

Very truly yours,


June Spence
President

JS:sd

LETTERS RECEIVED BY THE
CHIEF OF ENGINEERS AS A RESULT
OF COORDINATION OF THE REVISED
DRAFT ENVIRONMENTAL STATEMENT

APPENDIX B



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In reply refer to:
PEP ER-74/1334

FEB 5 1975

Dear General Gribble:

Thank you for your letter of October 23, 1974, requesting the Department of the Interior's comments on the revised draft environmental statement and feasibility report for Flood Control, Minnesota River at Chaska, Carver County, Minnesota. We offer comments on both documents.

Feasibility Report

We have reviewed your proposed report and concur with its contents.

The recreation feature of this development conforms to and is in accord with the Minnesota Comprehensive Outdoor Recreation Plan. The estimates of recreation use and benefits appear reasonable.

No established or studied units of the National Park System on any National Landmark (national or historic) would be adversely affected by the proposed action.

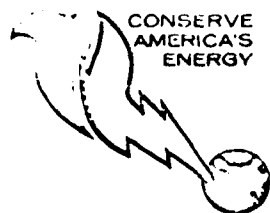
We do not anticipate adverse impacts on mineral resources in Carver County, or in Chaska, Minnesota, attributable to the proposed project.

Fish and wildlife resources in the project area and the anticipated effects of the project on these resources are adequately described in the report.

Environmental Statement

With reference to page 28 (third paragraph) of the revised draft statement, according to a USGS study (Quetzkow and

Carlson, 1973, Floodplain areas of the lower Minnesota River; USGS Water Resources Invest., Rept. 15-74) the flood of April 1965 reached a stage of 722.8 feet at the



Save Energy and You Serve America!

Corps of Engineers gage in Chaska, and the flood of 1969 reached a peak stage of 720.9 feet. The 1965 flood slightly exceeded the 1-percent flood.

It seems appropriate here to excerpt the following two paragraphs from the "History of Flooding" section of the above-referenced report:

"The pattern of development on flood-plain areas has changed in recent years. Diking to protect existing industries and new industrial expansion across large areas of the flood plain have increased the upstream flood potential. The most severe encroachments are in the reach extending several miles upstream from Interstate Highway 35W.

"As part of this study, a detailed analysis was made of the peak discharge associated with the 1969 flood for flood-plain conditions existing in 1969 and also for those conditions existing in the spring of 1972. This analysis indicates that added encroachment on the flood plain since 1969 would increase the elevation for a flood of the same magnitude by almost half a foot in the Savate area. Although the increase in elevation would diminish upstream, some of the effect would continue to Carver Rapids."

It is indicated in the first paragraph on page 70 that additional contacts are to be made with the Minnesota State Historical Society whose director, Mr. Russell W. Tridley, is the State Historic Preservation Officer. Specific comments received from the State Historic Preservation Officer should be incorporated into the final statement.

We note that while our comments on archeological resources (contained in Mr. McGrath's letter of July 18, 1973, in Appendix A) have been acknowledged, no specific arrangements appear to have been made for an archeological investigation of the Oliver Faribault fur post site. This site should be located and its significance determined prior to the commencement of any construction activities. If it is determined that excavation is necessary, the final statement should indicate arrangements that have been made adequately mitigate the impact through salvage excavation.

The final statement should also reflect procedures to be followed in the event that previously unknown archeological resources are encountered during project development.

Under item 21 on page 71 we assume that the University of Minnesota, Department of Anthropology should be inserted instead of the Minnesota Historical Society.

The project design changes described in the feasibility report and the attendant revisions in the draft environmental impact statement do not significantly alter the previously proposed improvements and, therefore, do not increase the mineral resource involvement. We do not anticipate adverse impacts on mineral resources in Carver County, or in Chaska, Minnesota, attributable to the proposed project.

The impacts of the proposal on recreation, fish and wildlife resources appear to be adequately evaluated. We agree that greenways are a desirable addition to this project; however, it should be noted that they probably will not have high value as wildlife habitat.

With the above exceptions, we believe the environmental impact statement is accurate and sufficiently complete with respect to water resources.

Sincerely yours,



Deputy Assistant Secretary of the Interior

W.C. Gribble, Jr.
Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D.C. 20314



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

March 7, 1975

Lt. General William C. Gribble, Jr.
Chief of Engineers
Office of the Chief of Engineers
Department of the Army

Dear General Gribble:

This is in response to your letter of October 23, 1974, transmitting for our review and comments your proposed feasibility report with pertinent papers and the revised draft environmental statement for Minnesota River at Chaska, Minnesota.

We have no substantive comments on either the report or the draft environmental statement. We are enclosing two editorial type comments which you may wish to consider when preparing the final report.

Sincerely,

Robert W. Long
Assistant Secretary for Conservation,
Research and Education

Enclosure

6.02

U. S. DEPARTMENT OF AGRICULTURE

Comments on Interim Survey Report and
Revised Draft Environmental Statement

Local Protection Project - Minnesota River at Chaska, Minnesota

1. In the discussion of benefits from savings of flood proofing costs on pages C-20 to C-22, the report should stress that in estimating future flood damages without project the mitigating effect of flood proofing has been taken into account and is not double counted.
2. The first sentence at the top of page E-12 indicates that Table C-11 presents an estimate of future flood damage reduction from regulation of flood plain land use and development. This appears to be an error since Table C-11 gives flood damages at specified frequencies.



**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

MAILING ADDRESS
U S COAST GUARD (G-WS/73)
400 SEVENTH STREET SW
WASHINGTON, D. C. 20590
PHONE: (202) 426-2262

. 9 January 1975

• Lieutenant General W. C. Gribble, Jr.
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Gribble:

This is in response to your letter of 23 October 1974 addressed to Secretary Brinegar concerning your draft environmental statement on the Minnesota River, Carver County, Chaska, Minnesota.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Federal Highway Administration had the following comments to offer:

"The discussion of corridor location studies for 'Trunk Highways 169, 212 and 41' appearing on page 24 might be updated in the final by citing the fact that FHWA draft statements for location approvals on U. S. 212 and Minnesota Route 41 have been developed and were transmitted to CEQ on September 27 and October 11, 1974, respectively. Another draft EIS is being developed for FHWA location approval on U. S. 169.

"Similarly, we note that the discussion of historic properties on pages 30 and 31 does not appear to fully show compliance with the procedures for identification of properties eligible for inclusion in the National Register of Historic Places per paragraph 800.4(a)(2) of the ACHP procedures. Consultation was with a local historian rather than with the appropriate State Historic Preservation Officer which is the Director of the Minnesota Historical Society. This apparent discrepancy is also reflected by the notation on page 71 which suggests that response from the State Archeologist constitutes comments from the Minnesota Historical Society whereas these are two separate and distinct entities. We bring these to your attention not in criticism of the revised DEIS, but as technicalities which could possibly be improved in the Corps final EIS and thereby help protect them from future problems."

The Department of Transportation has no other comments to offer nor do we have any objection to this project. However, the concern of the Federal

Highway Administration should be addressed in the final statement.

The opportunity to review this draft statement is appreciated.

Sincerely,

W.E. Caldwell

W. E. CALDWELL
Captain, U.S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION V

230 SOUTH DEARBORN STREET

CHICAGO, ILLINOIS 60604

Colonel Marvin W. Rees
Executive Director of Civil Works
Department of the Army
Office of the Chief of Engineers
Washington, D. C. 20314

February 21, 1975

Dear Colonel Rees:

We have completed our review of the Revised Draft Environmental Impact Statement (EIS) for Flood Control at Chaska, Carver County, Minnesota as requested in your letter dated October 23, 1974. We have classified our attached comments as Category ER-2. Specifically, this means that we have environmental reservations regarding the project, and we believe that additional information should be provided in the EIS to more fully assess the total project impact. This classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on Federal actions under Section 309 of the Clean Air Act.

As you are aware, we have had considerable involvement in the proposed flood control project at Chaska through a site inspection with the district staff and our review of the previous Draft EIS on June 18, 1973. Our comments expressed the desirability of using a more environmentally compatible alternative such as flood plain regulation and requested additional information regarding spoil disposal and the project's impacts upon wetlands, water quality and land use. We believe the Revised Draft EIS inadequately addressed our comments on the Draft EIS and we still have reservations with regard to the secondary effects of urbanized development in the upper watershed and project-induced flood plain and wetland encroachment upon water quality and flood levels.

We appreciate the opportunity to comment on this Revised Draft EIS. Should you have any questions regarding our comments, please contact Mr. Gary A. Williams or me at 312-353-5756.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Donald A. Wallgren", written over a horizontal line.

Donald A. Wallgren

Chief,

Federal Activities Branch

Attachments

As Stated

EPA's COMMENTS ON THE REVISED DRAFT EIS FOR
FLOOD CONTROL AT CHASKA, CARVER COUNTY, MINNESOTA

PROJECT DESCRIPTION

The existing and future intermediate regional flood plain (IRFP) at Chaska should be described in detail. While the EIS and Feasibility Report (FR) illustrate an IRFP area at Chaska with future runoff conditions, an exhibit should be included to show how project improvements will reduce this IRFP area. The separate and combined benefits of each of the proposed structural measures with respect to reducing the IRFP area should be described in detail and portrayed with contours on a map overlay. A similar portrayal for alternative nonstructural and structural measures would also be desirable.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Wetlands represent a unique, irreplaceable water resource. It is our policy to give particular cognizance to any proposal that has the potential to damage wetlands, to recognize their value, and to preserve and protect them from damaging misuses. It is indicated that this project will cut across the west end of a 230-acre flood plain wetland and will adversely impact 30 acres of wetland that has already been partially drained by private interests. As described in the EIS, the 230 acres are confined to a "bench east of Chaska between Carver County Highway 17 and Bluff Creek on the west and east and between Highway 212 and the valley bluffs on the south and north." It is not clear whether this includes wetlands on both sides of the Minnesota River or only the north side. It was also stated that the Minnesota and St. Louis Railroad bisects the wetland from west to east and that the portion north of the railroad is a marsh with cattail, bulrush and smartweed while south of the railroad the wetland is a wet meadow. The value of the 230-acre tract of wetlands should be described in more detail and their location illustrated on a map exhibit. While some observations of the project's effects have been made on the remaining 200 acres of wetland, the EIS indicated that the degree and area of impact "cannot be adequately assessed" and "definitive judgements would require further study." According to the EIS, it appears that the wetlands are recharged by shallow aquifers having an eastward flow that may be subject to cut off by the bypass channel. Local surface and subsurface drainage inherent to the wetlands hydrologic cycle should be portrayed on a map overlay or with geological profiles.

The Shakopee Quadrangle indicates the 230-acre tract of wetlands using the boundaries given in the EIS to be composed of general independent wetland areas rather than being one large single tract. While the wetlands are a part of the same flood plain ecosystem, the natural and

manmade features affecting each wetland area are unique and intrinsically responsible for their continued existence. Each major wetland sector should be described relative to these factors, i.e., local geology and land forms, drainage and general wildlife resources. During our field inspections in June 1973 and July 1974, we observed several pond areas in the 30 to 40 acre wetland area south of the trailer park between the wet meadow zone and the flood plain forest. Since this wetland area will be impacted by the project, a detailed assessment of the waterfowl and fishery resources of these ponds and any remaining undrained and unfilled portions of this wetland tract should be included in the EIS. The relative ecological and social importance of this particular wetland area as compared to the other wetland sectors in the area - Nyssens Lake wetlands and the West Rice Lake wetlands west of Bluff Creek - should be established in the EIS. Additional information on how the bypass channel will affect and complete the drainage of the 30-acre wetland (page 33) and on the extent of private drainage already accomplished should be provided in the EIS. The long-term effects of this project upon the remaining wetlands in the area should be noted.

The new Corps of Engineers policy regarding the safeguard of wetlands as described in the April 3, 1974 Federal Register is highly desirable and consistent with our own views (May 2, 1973 Federal Register). Such policy could substantially discourage the unnecessary alteration and destruction of wetlands considered to be vital to the riverine flowage. Although this policy is directed primarily toward the evaluation of permit applications, we fully realize the inherent responsibilities to follow your policy and the guidance of other agencies in wetlands preservation.

In our August 29, 1974 comments (copy attached) on the Draft EIS for M.R. 41, we express environmental reservations regarding the crossing of Minnesota River in this area and the removal of flood plain wetland. We have also attached a copy of our December 12, 1974 comments on the Draft EIS for U.S. 212. The effects that both of these projects will have upon the subject flood control proposal should be carefully considered and addressed in the Final EIS. These highway projects will certainly affect watershed drainage and therefore, should be appraised in the project's design and benefit/cost computations.

The secondary effects of this project upon water quality and future flood levels have not been addressed. The usefulness of the data provided by the hydrograph model of the watershed and the responsiveness of the model to project-induced and future land use development in the watershed should be substantiated. The EIS should indicate the level of urban development in the watershed that was considered for the 100 year intermediate regional flood. It should be recognized that as the watershed

becomes increasingly urbanized and more impervious, higher rates and amounts of runoff will result. Of the total 15,860 acres in the composite watershed, approximately two-thirds are scheduled to be part of the planned community of Jonathan. The consequences of future urbanization such as the Jonathan model development and extensive highway interchange and frontage development in the watersheds should be analyzed sufficiently to determine appropriate runoff adjustment factors for computing storm flows and flood frequencies. Otherwise, project benefits and costs may be based on parameters that may not be realistic nor fit the more urbanized conditions in the future.

According to the FR, the East Creek flood bypass structure and channel were designed to pass the standard project flood of 8430 cfs at the proposed point of diversion. This will easily accommodate the intermediate regional flood (1% flood) flow of 4700 cfs at this point. However, even with the East Creek bypass structure, it is indicated that there are sufficient tributary flows downstream to cause bank overflows and local flooding from approximately 1000' upstream of the USH 212 bridge to an area south of the Beech Street bridge (B-19). While it was noted that anticipated flood damages from an intermediate regional flood for this reach would be minor, the severity of damages from floods greater than an intermediate regional flood, such as the standard project flood and the probable maximum flood is not known. According to pages B-17, B-19 and Plate E-4 of the FR, flows varying from 1180 cfs at the USH 212 bridge to 1294 cfs at the flood control levee would occur on East Creek during an intermediate regional flood. While stream notation is not clear in Table C-12 of the FR, it appears that flood damage begins at 500 cfs for East Creek and 1000 cfs for Chaska Creek. Since flows are still expected to reach 1180 cfs at USH 212 during an intermediate regional flood even after project construction, we believe the extent of anticipated flood damage (C-12) from flows greater than 500 cfs passing East Creek should be described in more detail. The internal drainage effects that intermediate regional flood, standard project flood and probable maximum flood flows will have upon Chaska's proposed land use scheme in the East Creek flood plain should be discussed in the EIS. Information on internal flow rates and/or external flood levels that would necessitate the closure of the gravity outlet at the proposed East Creek levee crossing should be included in the EIS.

ALTERNATIVES TO THE PROPOSED ACTION

An exhibit should be included in the Final EIS showing the alternative diversion routes for East Creek under Plan 6. Was a route considered through the creek flowing east past the Assumption Seminary? Would this creek's natural floodway have sufficient capacity to contain the

desired flows from East Creek without channelization or extensive structural works? If the undeveloped flood plain downstream could handle bank overflows, structural works for this route would only need to be constructed in the upstream portion of the creek; the Assumption Seminary could be protected by structural measures, if necessary.

Consideration should be given to using the electric power line right-of-way in part or total for the bypass structure to prevent unnecessary erosion and removal of the flood plain forest.

The Nonstructural Alternative Plan 2 regarding total flood plain evacuation should correspond to the IRFP areas shown on Plate 2. We agree that flood plain evacuation with zoning and regulation is a plan that would provide permanent protection from flood damages within the regulatory flood plain. While total evacuation of the IRFP may be impractical as a short-term goal, it may not be as a long-term goal. We believe further consideration should be given to partial evacuation of those flood plain areas most prone to flooding as a short-term goal and to total evacuation as a long-term goal. Such an alternative would ultimately eliminate the major portion of flood damages. As pointed out in the EIS and the FR, most growth is and will be occurring in the Jonathan Unit and other suburban areas above the bluff and as such would render the old section of Chaska in the flood plain less important. It was further indicated that little development is expected in the future within the leveed area of Chaska since these areas are already nearly fully developed.

However, we note that the flood plain area immediately north of Courthouse Lake and along East Creek will be subject to residential development after construction of the new levee structure as shown by Chaska's future land use plan. Comparison of the IRFP contour (Plate No. 2 of the EIS) with existing and future land use areas (Plate No. C-1 and No. C-2 of the FR) also reveal other IRFP areas along East Creek that will be subject to residential, commercial and industrial development. Such development is not compatible with the flood plain system and should be discouraged. Executive Order 11296, August 10, 1966 requires Federal agencies to provide leadership in encouraging broad and unified effort to prevent uneconomic uses and development of the Nation's flood plains and, in particular to lessen the risk of flood losses. The responsibility imposed by this Executive Order and our mandated concern for water quality consequences of flood damage require us to take an active interest in flood plain encroachment. While this project will reduce flood damages to Chaska, it will not eliminate them. Therefore, the need for an effective flood plain management plan is apparent. With proper planning and

Implementation of regulatory controls, the alternative of flood plain management could be an effective solution to minimizing flood damages. This alternative would be more advantageous on the regional and State scale because it is more environmentally, socially, and economically compatible than the proposed project. Consideration should also be given to developing alternatives that incorporate portions of some or all of the non-structural alternatives and, where absolutely necessary, portions of structural alternatives.

Thus, in order to preclude the possibility of project-induced flood damage due to future development in the floodable area of the East Creek and Minnesota River flood plain, we request a firm commitment from local interests to flood regulate and compatibly zone flood prone areas in the IRFP. This commitment should be made a part of the local assurances to be provided before any construction can be initiated.



STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

(544)

June 11, 1975

W.C. Gribble, Jr.
Lieutenant General, U.S.C.
Chief of Engineers
Washington, D.C. 20314

Re: DNR-CWP-A

Dear Lieutenant General Gribble:

Thank you for the opportunity to review the Revised Draft Environmental Impact Statement for Flood Control at Chaska, Minnesota. We feel that our previous comments in the letter of July 24, 1973, were properly recorded and received adequate treatment in the text of the revised document.

There is however, a problem in the treatment of Plan 4 and Plan 5 (see pp. 46-50). The Plan 4 discussion on the National Flood Insurance Program contains gross inadequacies and does not appear to reflect the provisions of PL 93-234, the Flood Disaster Protection Act of 1973, which was signed into law on December 31, 1973. Until such time as this section is rewritten to reflect present-day laws and provisions, it is unacceptable to us.

Also, we are not pleased with the treatment given to Flood Plain Regulation in Plan 5. Although erroneous statements are fewer, this section is vague and does not satisfactorily deal with the subject.

We would recommend that both of these sections be rewritten. We would offer our services to help on either plan but please note that the Federal Insurance Administrator of the Department of Housing and Urban Development is responsible for administering the Flood Disaster Protection Act of 1973 and thus, would be your best source of information for Plan 4.

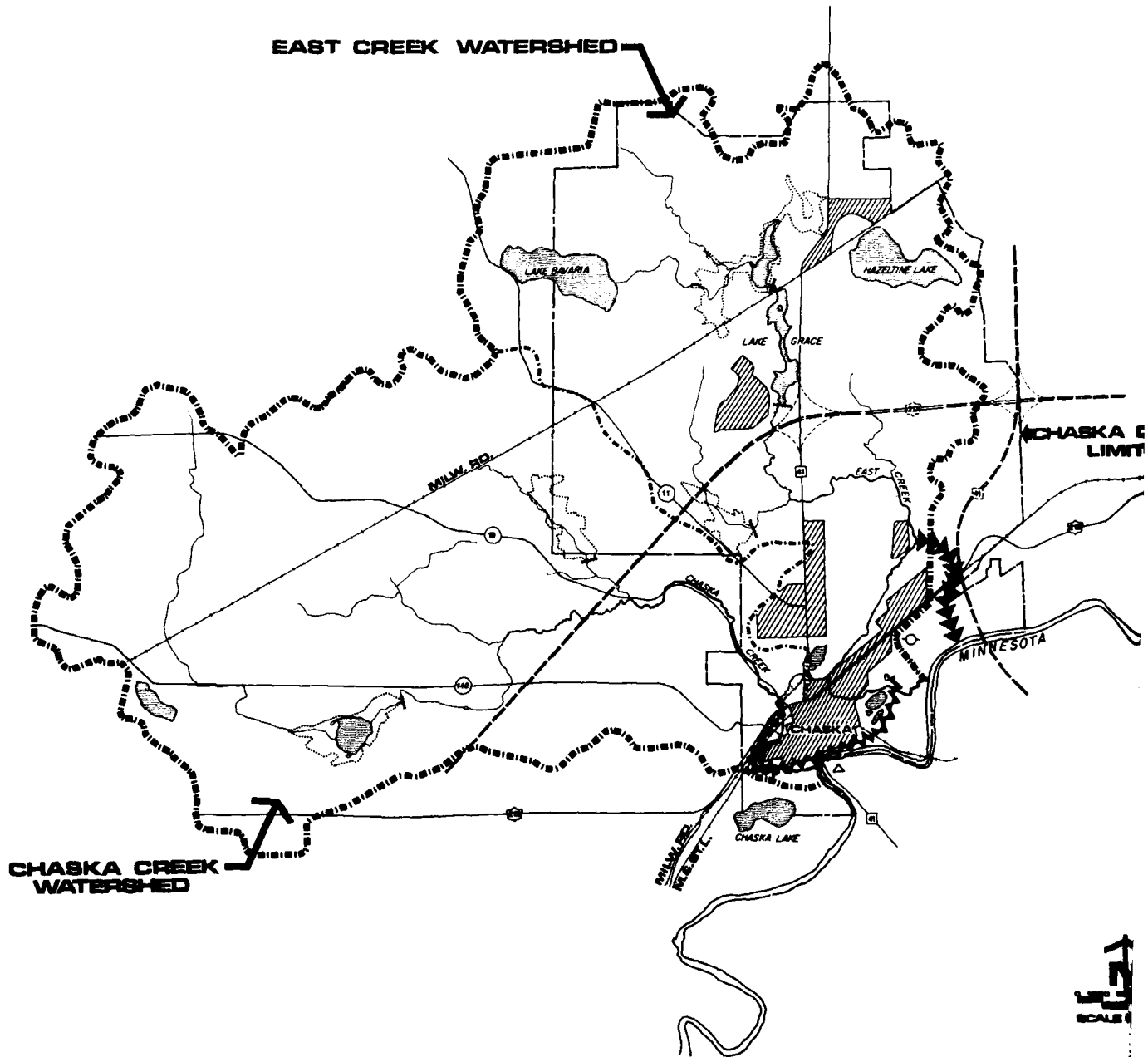
Sincerely,

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best available copy.

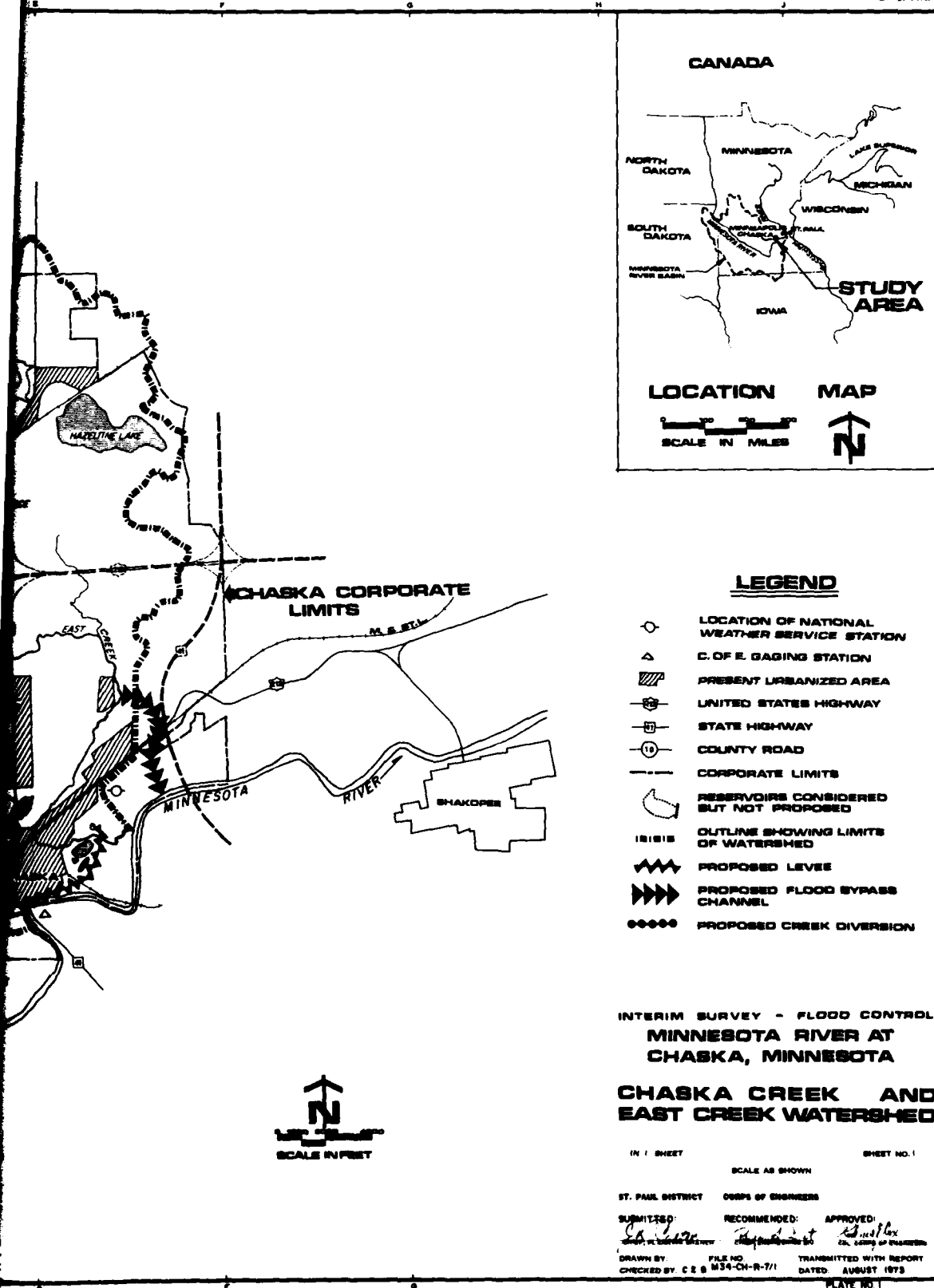
Robert L. Herbst
Commissioner

By: _____
C. B. Buckman, Deputy
Commissioner of Natural Resources

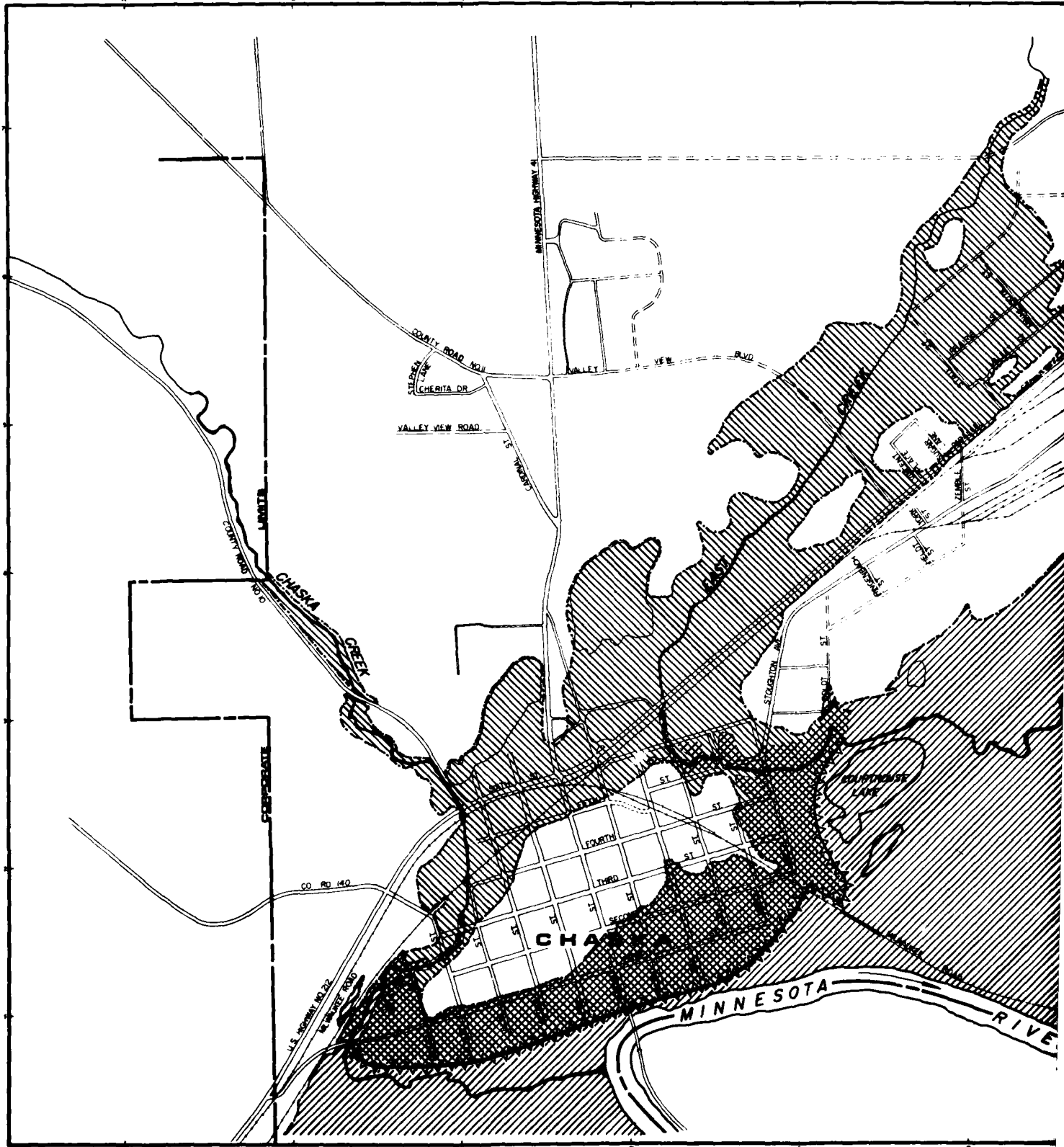
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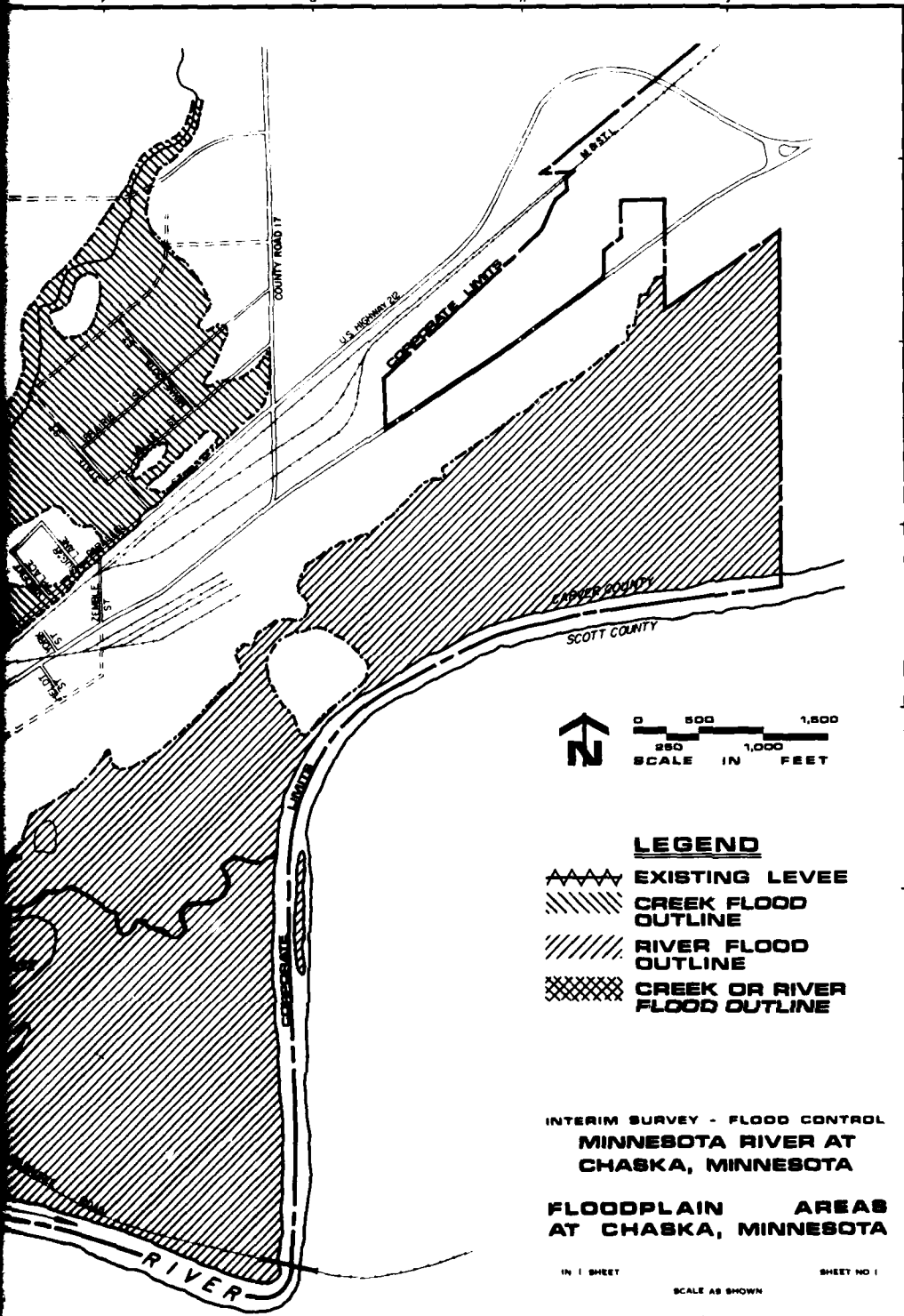


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CORPS OF ENGINEERS





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INTERIM SURVEY - FLOOD CONTROL
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CHASKA, MINNESOTA

FLOODPLAIN AREAS
AT CHASKA, MINNESOTA

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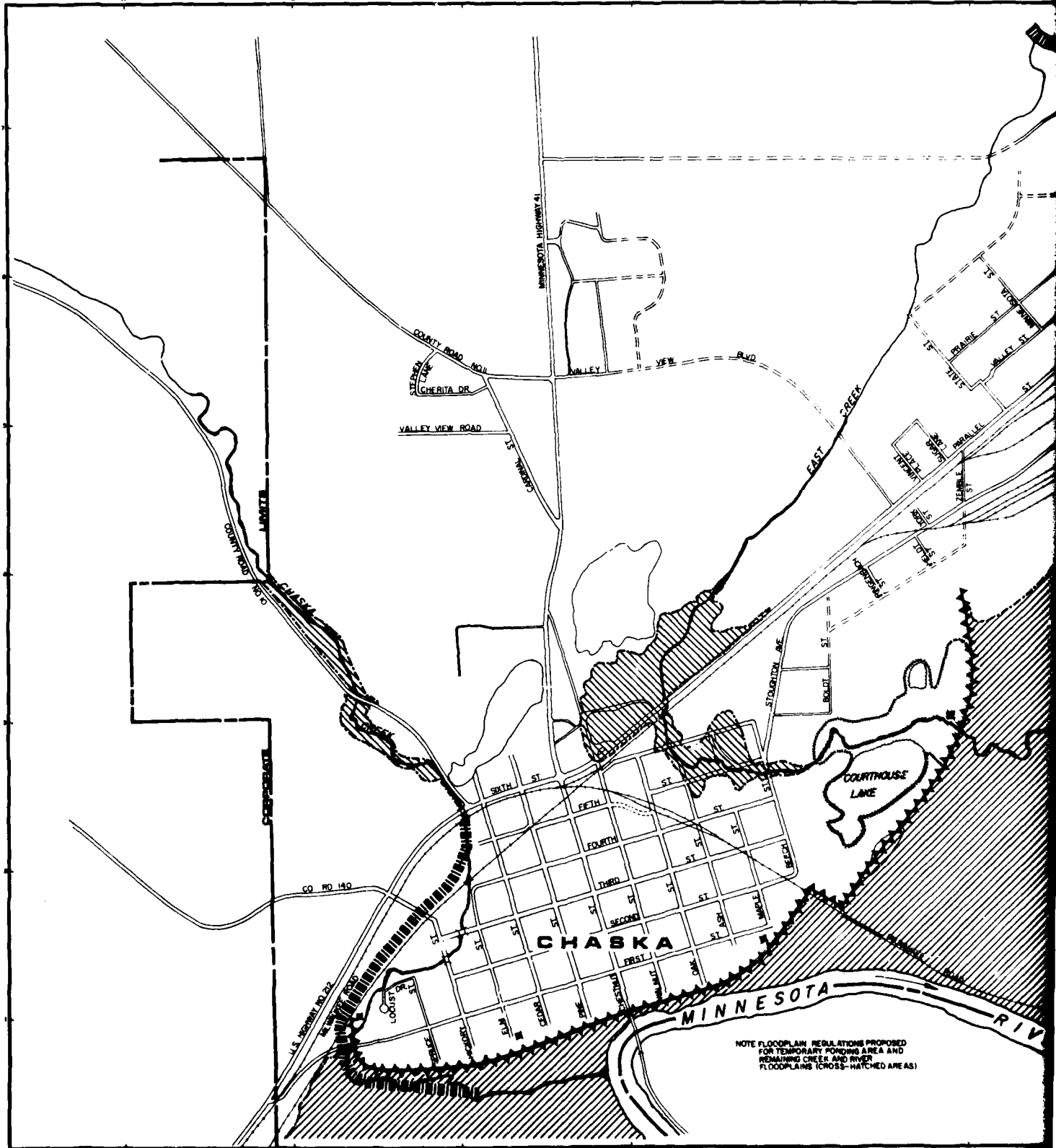
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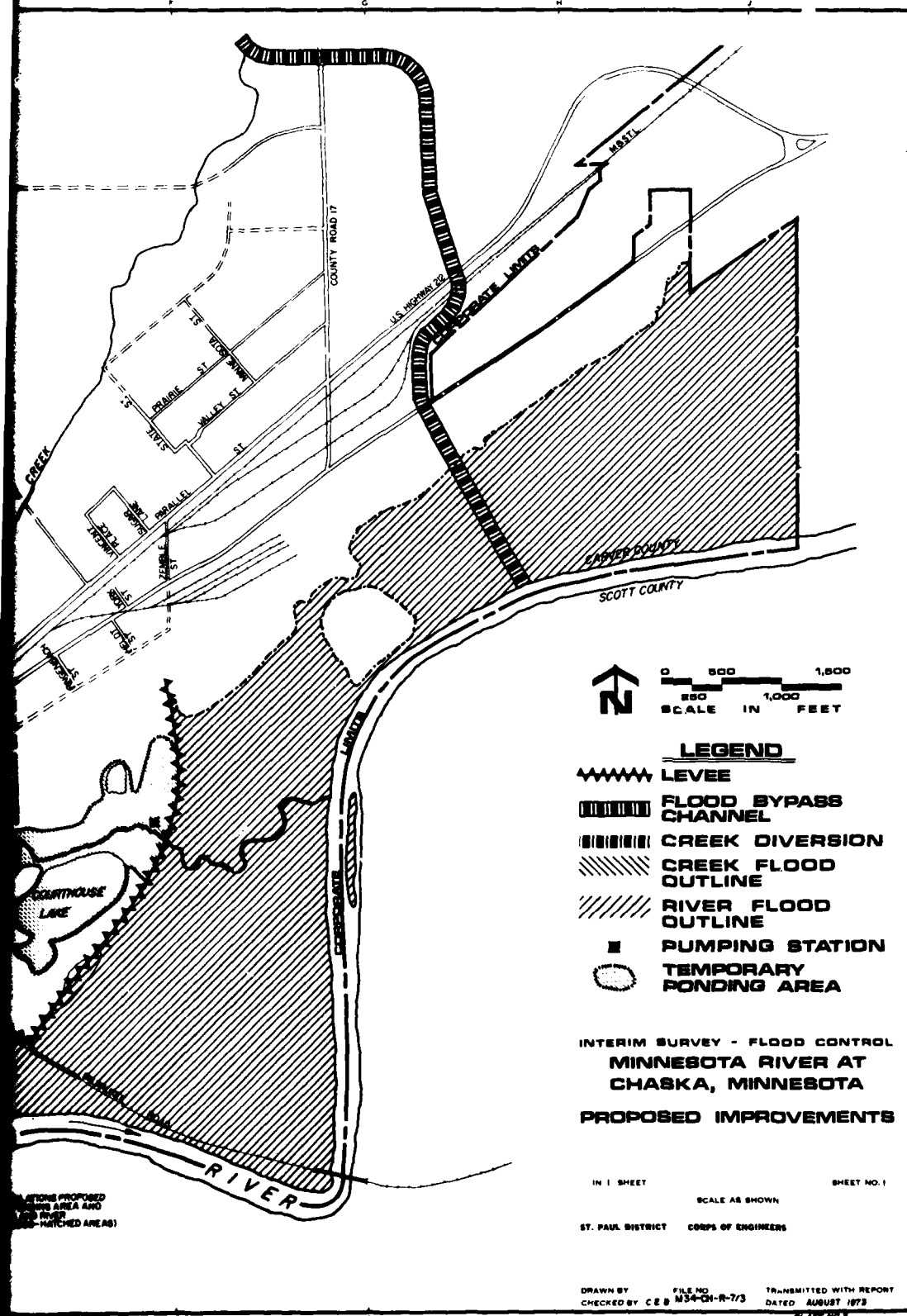
ST. PAUL DISTRICT CORPS OF ENGINEERS

DRAWN BY FILE NO. TRANSMITTED WITH REPORT
CHECKED BY C.E.B. M34-CH-R-72 DATED AUGUST 1973
PLATE NO. 1

CORPS OF ENGINEERS



NOTE FLOODPLAIN REGULATIONS PROPOSED FOR TEMPORARY PONDING AREA AND REMAINING CREEK AND RIVER FLOODPLAINS (CROSS-HATCHED AREAS)



ATE
LMED
-8